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# TRANSPORTATION OF NUCLEAR WASTE

413

MF14 ORIGINAL

# HEARING

BEFORE THE

SUBCOMMITTEE ON COMMERCE, TRANSPORTATION, AND TOURISM

OF THE

COMMITTEE ON ENERGY AND COMMERCE
HOUSE OF REPRESENTATIVES

NINETY-NINTH CONGRESS

FIRST SESSION

AUGUST 1, 1985

**Serial No. 99-54**

Printed for the use of the Committee on Energy and Commerce

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I

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# TRANSPORTATION OF NUCLEAR WASTE

THURSDAY, AUGUST 1, 1985

House of Representatives,
Committee on Energy and Commerce,
Subcommittee on Commerce,
Transportation, and Tourism,
*Washington, DC.*

The subcommittee met, pursuant to call, at 9:30 a.m., in room 2218, Rayburn House Office Building, Hon. James J. Florio (chairman) presiding.

Mr. Florio. The subcommittee will kindly come to order.

In order that we may deal with an extremely important problem that has been brought to the committee's attention by our colleague and member of the Energy and Commerce Committee, Mr. Scheuer, I would like to welcome all attendants to the subcommittee's hearing on questions with regard to the safe and efficient transportation of high-level nuclear waste.

Today we will hear from several colleagues and other public officials as well as citizens who are concerned about the safe transport of nuclear materials. Irradiated nuclear fuel is such a hazardous material that if it is ever released following an accident during shipment, there could be unmitigated disaster—in terms of both human and economic loss.

It is of primary importance that we, as Members of Congress, as State and local elected officials and as private citizens, have complete confidence in the Federal agencies charged with the responsibility of ensuring the safe transport of hazardous materials, including high-level nuclear waste.

One year ago today, a truck carrying armed Navy torpedos overturned in Denver during rush hour. Fortunately no private citizens were killed, but the accident could have had horrendous consequences. What was the Federal response to this accident? Defense Secretary Weinberger said his Department was not responsible for the routing of its hazardous cargoes. He maintained that the Defense Department was simply using routes provided by the Department of Transportation and the Department of Energy.

Federal buckpassing is unacceptable. We need to have the confidence in DOT and DOE to provide safe and efficient routing of nuclear waste. Otherwise havoc will be wreaked with the interstate transport of spent fuel as States and localities will pass a patchwork of laws to protect their citizens.

We are here today to learn about the Department of Transportation's routing scheme. Certainly, the uniformity of Federal rulemaking at the expense of State and local laws ensures swift transport, but does it ensure safety? Uniformity is not an end in itself. Furthermore, why has one mode of transportation been deemed safer than others? We will be interested in learning the answers to these important questions.

We are also here today to learn if the Department of Energy merits our confidence. Has the Department tried to hide behind DOT regulations instead of dealing with the vexing problem involving DOE's Brookhaven National Laboratories on Long Island in the State of New York?

I am sure my colleagues from New York and our colleagues from Connecticut who will be testifying today, as well as other witnesses, have much to say on this facet of the entire problem.

I am glad that both the Department of Transportation and the Department of Energy are well represented today as we attempt to learn the answers to some critical questions. It is imperative that both Departments gain the public's confidence. The Federal Government should be recognized as working with and not against State and local governments in ensuring the safe transport of our high-level nuclear waste.

At the conclusion of the first panel's testimony, we are going to ask our colleague, Mr. Scheuer, if he would like to sit with the subcommittee, and he has indicated he would. We appreciate his patience as a member of the committee.

I would say that we are going to be joined by Mr. Lent before too long. He is unavoidably delayed, and there will be other members coming from our full Energy and Commerce Committee through the course of the day. At some point during the course of the morning I am going to have to leave to attend the Rules Committee. The Federal Trade Commission authorization is up this morning, as well as the Railroad Safety Act, which is related or may be related to this question that we are dealing with today. So there will be other members coming in to chair the hearing.

That in no way diminishes my sense of importance as to what we are doing because, as I am sure all of the people in attendance can be aware of and be sensitive to, we do not have control over our schedules here in the House of Representatives.

I would like at this point to introduce the members of our first panel who are here. We are pleased to have our colleague from Energy and Commerce, Hon. James Scheuer. We are pleased to have Hon. Gary Ackerman from New York, and Hon. Tom Manton from New York as well. And they have brought to my attention the lead role in this issue that the borough president of Queens has played, and we are pleased to have the borough president here as part of our first panel, Hon. Donald Manes.

Perhaps in deference to one of our members, we would ask our colleague, Mr. Scheuer, to go forward with his testimony. As with all of our testimony, formal statements of those who are testifying will be put into the record in their entirety. The witness should feel free to proceed in a summary fashion.

## STATEMENTS OF HON. JAMES H. SCHEUER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK; DONALD R. MANES, QUEENS BOROUGH PRESIDENT, NEW YORK, NY; HON. GARY L. ACKERMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK; HON. THOMAS J. MANTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK; AND HON. JOSEPH J. DioGUARDI, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK

Mr. Scheuer. Thank you very much. And I wish to thank you for your demonstrated concern of the transport and disposal of nuclear waste. You have been a consistent supporter of a look-see into this problem. We appreciate the trouble you went to in arranging this hearing on the last day of the session when there was so much pressure to adjourn. You nevertheless took your time and energy to arrange this hearing.

Mr. Florio. Let me say at this point that appropriate credit should be given to the ranking minority member, Mr. Lent, who likewise brought to my attention the significance of this problem in large measure. It is with his cooperation we are having this hearing.

Mr. Scheuer. He has been a constant supporter of this effort in this matter as well as other matters where he has looked to the interest of New York above and beyond party lines. We appreciate his total cooperation and support as well.

I wish to thank the borough president over his many years on this subject, as well as my two colleagues, along with Congressman DioGuardi who has arrived. Congressman DioGuardi has been cooperative and played a key role in bringing us to the point we are at today.

Mr. Chairman, the fact that we have a witness list as long as your arm is eloquent testimony to the vital importance in which this matter is held by public officials, and, of course, by the citizenry they represent. As a matter of fact, I think it is a truism that the key to successful development of nuclear energy as an element, a necessary component in our national energy mix, depends absolutely on how we solve the question of the transport and disposal of nuclear waste. We believe it is absurd to truck the Brookhaven nuclear waste through the most densely occupied urban area in the country and over the most congested highways in the country.

I first became involved in this issue in 1975 when I represented Kennedy Airport, and I knew that shipments of plutonium were being transported by air into Kennedy Airport. There was some question then as to the safety and integrity of the cask, and I sponsored an amendment to the Nuclear Regulatory Commission authorization bill of 1975 to prohibit the transport by air of nuclear waste until the Nuclear Regulatory Commission notified the Congress they had developed a safe container.

Now they testified against my amendment and implored both the House and Senate and subsequently the President not to support it because they said they were within days or, at the most, weeks of developing a safe container. Nevertheless, my amendment was passed and signed by the President, and it was 4 years before they finally certified to the Congress that they had developed a safe container.

Sometimes things are not as simple as they seem, and the assurances of the executive branch to the Congress cannot be taken at full value when we have found that situation very important in the last year. It was incidentally these same shipments of plutonium through Kennedy Airport that prompted the New York City Council in 1976 to ban shipping by truck of plutonium through New York City streets.

Now over the past 18 months, I have worked with the Congressmen you see here representing both parties with our very distinguished borough president, with Mayor Koch of New York, to keep nuclear waste off our city streets. We have met with Secretary of Energy John Herrington and former Secretary Donald Hodel, and we met with them especially about our concern over the integrity of the cask, the MH-1A cask. They assured us there was no problem with the integrity of the cask.

Yet we now know for the 13 months we were discussing this matter with them, and they were telling us with great assurance there was no problem with cask integrity, that the Nuclear Regulatory Commission was inquiring of them, with the most serious kinds of reservations, about the safety of the MH-1A cask and has now ordered them to stop shipping nuclear waste in that cask until 11 specific concerns about the integrity of that cask have been satisfied.

The integrity of the cask remains a serious issue as well as the integrity of those executive branch agencies that have so misadvised the Congress and so sadly failed to give forthright, candid counsel and advice to Congressmen, as we are attempting to solve what is a desperately important national problem.

With the subcommittee's indulgence, I would like to ask unanimous consent to make those documents a part of this record.

Now, when Congress passed the Hazardous Materials Transportation Act in 1974, Mr. Chairman, I think Congress envisaged a partnership between the Federal, State, and local governments and certainly between the executive branch and the legislative branch. We have not received that kind of treatment from the Department of Energy.

Rather than a forthcoming, frank and honorable exchange of information to the best of their ability, we have been roadblocked and stonewalled, and this has resulted in tension, resentment and legal proceedings which are totally unnecessary and should not have occurred.

But because of its unique geography, New York is one of the very, very, very few places in the country—I know of only one other—that does not have a beltway and, therefore, where nuclear wastes are transported through rather than around the city. To the best of my knowledge, Denver, CO, is the only other city so situated.

New York City recently commissioned a study from the distinguished consulting firm of Arthur D. Little for which they paid $100,000 to find the safest and best way to transport nuclear waste. Arthur D. Little, after months of study, finally advised the city that they should transport nuclear materials, rather than through the city over the most congested highways in the world—through the most congested areas in the world—they should transport the nuclear waste by barge from Orient Point, Long Island to New London, CT, on its way to the reprocessing plant in Idaho.

They found that at a marginal cost to the Federal taxpayer, there would be a 32-percent reduction in the risk of a nuclear release as the result of a trucking accident. That is a very significant reduction in risk, Mr. Chairman, and if the Department of Transportation does not give the bargaining alternative the most serious consideration, it would be a very poor exercise of their authority and just bad Government. It is my deep conviction this whole business of transport and disposal of nuclear waste is far too important for our country to be bandied about, to be played politics with, to be the subject of unpleasant, tense, arms-length legal proceedings, harsh criticism back and forth.

This is the time for us all in the executive branch, in the legislative branch at the Federal, State, and local government to pull together to solve this problem in the interest of 240 million Americans so that we can transport and dispose of these wastes with maximum cost effectiveness and, above all, with maximum safety to our cities. There must be more cooperation, more civility between States and the Federal Government.

Mr. **Florio**. That is a very important point.

Mr. **Scheuer**. Between the executive and legislative branches. We have no other choice but to work together, abandoning petty politics and petty jealousies in an effort to do the best for the American people.

Mr. Chairman, I have been informed by staff that it is not possible to accommodate in this tremendous schedule of witnesses all of the people who wish to appear. I especially wish to pay tribute to Lindsay Audin who is widely recognized for his expertise in the safe transportation of nuclear waste. He has been working in this subject area for 10 years. He has advised the city of New York and he has advised the Council on Economic Priorities. He has advised Congress' own Office of Technology Assessment and is looked upon as a national expert. He is known for his thoughtfulness, judgment and profound knowledge.

Mr. **Florio**. If the gentleman would yield, the gentleman has been commended by so many individuals, Members of Congress as well, to the degree we can expedite the process today, if we have appropriate time and interest at the end of our proceeding—our scheduled witnesses, we have to be courteous to them—we will hear from the gentleman.

Mr. **Scheuer**. In that case, I yield back the balance of my time.

[Testimony resumes on p. 51.]

[The prepared statement of Mr. Scheuer and documents referred to follow:]

## STATEMENT OF THE HONORABLE

## JAMES H. SCHEUER, M.C.

Mr. Chairman, members of the Subcommittee, I commend you for your interest in holding this important hearing today and for granting me the opportunity to appear before you. I would also like to acknowledge Queens Borough President Manes for his hard work and outstanding leadership on this issue over the past year and a half.

As evidenced by the large and distinguished witness list, today's hearing is a matter of critical importance not only to the residents and representatives of Queens, but also to the entire population of the New York Metropolitan area and the State of Connecticut. In fact, the safe transportation of nuclear waste material and how we address this as yet unsolved problem is properly a national issue.

I first became involved with this issue back in 1975 when air shipments of plutonium were being flown in and out of New York City's JFK International Airport. Because JFK Airport was in the district I represented, I became very concerned when I learned that there were serious questions about the ability of the shipment casks to withstand a crash. During floor consideration of a Nuclear Regulatory Commission authorization bill in 1975, I was successful in offering an amendment which prohibited further air shipments of plutonium until the NRC developed and tested a cask capable of withstanding the impact and the explosion of an aircraft accident without rupturing. Although I was assured by NRC that my amendment was unnecessary because they expected to have such a cask available within a matter of weeks, it was 4 years before such a cask was in fact certified by the NRC. Ironically, it was these same shipments of plutonium to and from JFK airport by truck which prompted the New York City Council to amend its health code to ban truck shipments of all radioactive waste in 1976.

Over the past 18 months, I have worked with a bi-partisan coalition of Members of Congress, state and local elected officials and concerned citizens to keep Brookhaven nuclear waste shipments from rolling through the heart of New York City. It makes no sense to ship radioactive waste through our nation's most densely populated urban area over our region's most congested highways when a safer alternative exists. In telegrams, letters and meetings with federal officials, we have been guided by our sense of responsibility to ensure the protection of those whom we repreesent. In meetings I arranged with former Secretary of Energy Donald Hodel and with his successor, John S. Herrington, we raised questions about the integrity of the MH-1A cask used for the Brookhaven spent fuel shipments.

Even as we were receiving repeated assurances from two Secretaries of Energy that the MH-1A cask was safe, the Department of Energy was being warned by the NRC of potential defects in the cask design which rendered it unsafe. Despite repeated contact with DOE at the highest levels over fourteen months in our efforts to obtain information regarding cask safety, DOE never intimated NRC's serious reservations about the MH-1A cask design. How can we trust the structural integrity of the shipping cask when we can't trust the integrity of the Department which passes judgement on this crucial safety issue?

Finally, in May 1985, the Department of Transportation informed DOE that because of 11 specific concerns expressed by NRC, the MH-1A cask would have to be withdrawn from service until NRC formally agreed with the resolution of these issues. Although the shipments have been suspended temporarily to allow for modifications of a replacement cask, I find this entire matter of cask integrity, not to mention the integrity of federal officials, to be very disturbing.

I have copies of NRC, DOE and DOT correspondence and internal documents which prove that NRC raised a number of concerns about the construction of this cask as early as February, 1983 -- some twenty-three months before the Brookhaven shipments were resumed. With the Subcommittee's permission, I would like to make these documents available for the record.

The routing of any hazardous material, whether it is radioactive or not, demands the close cooperation of officials at all levels of government. When the Hazardous Materials Transportation Act was passed in 1974, Congress clearly envisioned a partnership role among state, local and federal governments in promoting the safe transportation of all hazardous materials. However, the rules issued by the U.S. Department of Transportation do not reflect the intent of Congress in this regard and as a result the routing of the Brookhaven shipments have been the subject of extensive litigation as well as tension between cities, states, and the federal government.

Because of it's unique geography, New York City does not have a circumferential highway system, or beltway, like other major cities. Accordingly, any spent fuel generated on Long Island by Brookhaven National Laboratories or LILCO's nuclear generating plant at Shoreham, which has been approved by the NRC for low level testing, must be shipped either overland through our nation's most densely populated urban center or by ferry around New York City.

Following enactment of New York City's ban in 1976 until this past January, no shipments of spent fuel were trucked through the City. During 1976, however, several shipments of spent fuel from Brookhaven National Laboratories were ferried across Long Island Sound to New London, Connecticut and then transported by truck to Savannah River, South Carolina. These shipments were halted when New London enacted its own ban that same year. Although New London's ban was preempted in 1978 when the Connecticut State legislature passed legislation which permitted irradiated fuel shipments with pre-notification and a state police escort, Brookhaven curiously chose not to make any further shipments by ferry.

In 1981, USDOT issued regulations for the routing of hazardous materials. These regulations, known as HM-164, preempt any non-federal law that requires pre-notification, extra guards or safety features; restricts the time of travel; or forces use of an alternative mode of transportation, such as rail or barge. An earlier USDOT rule for all hazardous materials shipments required avoidance of populated areas if possible. When HM-164 was issued, however, an exception was made for radioactive materials. As a result, all hazardous materials except radioactive shipments must avoid urban areas if possible. The rule explicitly states that it preempts non-federal radioactive routing rules if they prohibit the use of highways between any two points without providing a highway alternative. This exception defies logic and common sense. Especially when a barge or rail alternative is practical, economical and - most importantly - provides substantially greater protection for the health and safety of the general public.

Following the publication of HM-164 in January, 1981 USDOT issued guidelines in June, 1981 to assist state agencies in selecting "preferred" routes for radioactive materials. Although these guidelines permit state agencies to designate intrastate routes including ferry segments from one "preferred" highway to another, they are of little assistance in interstate routing. In the case of the Brookhaven shipments, negotiations would have to be conducted between the States of New York and Connecticut before the barge route could be so designated by New York. Although the State of Connecticut understandably opposes this option, USDOT has made no effort to bring the two states together to work out a routing agreement acceptable to both sides.

New York City has an application for a non-preemption determination pending with USDOT. This application is based on a detailed risk assessment analysis undertaken by the highly respected Arthur D. Little consulting firm. This analysis, submitted to USDOT in December, 1984 and supplemented with additional analysis this past May, concludes that utilization of a ferry from Orient Point, New York to New London, Connecticut would yield a 32% reduction in the risk of a highway accident. When one considers the marginal cost of chartering a ferry, it is clear that shipping the Brookhaven waste around New York City would not impose an unreasonable burden on interstate commerce and that it would provide greater protection than HM-164.

As I noted earlier, the practical effect of HM-164 has been extensive litigation regarding the routing of the Brookhaven spent fuel shipments. Millions of dollars have been spent in risk analysis, environmental assessments and litigation. This in turn has resulted in a great deal of tension not only between New York and the federal government, but also between New York and Connecticut. Clearly, this was not the intent of Congress when it passed the Hazardous Materials Transportation Act.

Regardless of the outcome of New York City's waiver application with USDOT, it is clear that a greater degree of flexibility in the rules for hazardous materials transportation is urgently needed to minimize the tension, conflict, and litigation over the routing of radioactive waste. It is for this reason that I am an original cosponsor of H.R. 1146 which was introduced by my colleague from New York, Mr. Weiss. I believe this legislation provides a thoughtful framework to resolve some of the problems which I have outlined this morning. This bill is worthy of careful consideration and I commend it to your attention.

In order to ensure that these shipments are transported with a maximum degree of protection for the public and that they are carried out as smoothly as possible, there must be greater cooperation between cities, states and the federal government. I look forward to working with the members of the Subcommittee to achieve this important goal.

Thank you for this opportunity to present my views.

9

FEB 24 1983

FCTC:RHO
71-6639

Department of Energy
ATTN: Mr. Reuben P. Prichard
Mail Stop E-201
Washington, DC 20545

Gentlemen:

This refers to your application dated September 7, 1982, requesting approval of the Model No. MH-1A packaging.

In connection with our review, we need the information identified in the enclosure to this letter.

Please advise us when this information will be provided. The additional information requested by this letter should be submitted in the form of revised pages. If you have any questions regarding this matter, we would be pleased to meet with you and your staff.

Sincerely,

Original Signed by
CHARLES E. MACDONALD

Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and
  Material Safety, NMSS

Enclosure: As stated

Distribution: w/encl
RHOdegaarden (2)
HWLee
CRMarotta
~~EPEaston~~ C E Williams
WHLake
Docket File
NRC PDR
IE HQ
Region I
NMSS R/F
FCTC R/F

Model No. MH-1A Packaging
Docket No. 71-6539

Encl to ltr dtd: FEB 24 1983

DRAWINGS

1. Drawing Nos. 1038-1 and 1038-2 do not clearly show the pertinent safety details for trunnions, tie-down lugs, valve boxes and stiffners. Provide drawings to show details of the construction, e.g., dimensions, sizes, locations, weldment types and dimensions, etc.

2. Revise the drawings and the materials list to reflect the revised pressure relief valve.

3. The fuel basket drawings should clearly state the Al cladding and $B_4C$-Al meat thicknesses, meat density, and composition.

STRUCTURAL

General

1. Revise the analyses for the fuel baskets taking into consideration the following:

   MURR Fuel Basket

   Intermediate Double Bend Plate will not be able to support the web plate force in a side drop condition (loss of water gap assumed in criticality analysis).

   HFBR and NBSR Basket

   The 0.25 inch diameter bottom rod will not be adequate to support the fuel in the basket for the bottom drop condition.

2. The analysis of the tie-downs on page 1-24 is not valid and should be revised because the tie-down cable forces do not satisfy the basic equalibrium condition (i.e., balance the applied load). It is also noted that the weldment size for the tie-down lugs shown on Drawing No. 1038-2 is not consistent with the analysis (page 1-26).

3. Show that the cask closure system, including the flange at the top of the cask wall, has adequate regidity to maintain a seal under the accident conditions and under excessive tie-down forces (§71.31(d)(3)).

4. For the external pressure analysis (page 1-34), justify the assumption that the end plate can be treated as fixed edge circular plate as in reality the end plate is neither circular nor fixed. Also, equations 1.39 and 1.40 are not applicable since they have ignored the forces at the edges where the flat sides meet the curved corner (axial, shear and moment). Bending moment effects at the corner should be considered.

5. The thermal differential expansion analysis presented on page 1-39 is not complete. The radial and axial pressure due to lead contraction on the containment vessel should be evaluated. Also, justify the assumption that the bolted edge of the cask cover is a fixed boundary (page 1-41). Provide an analysis to show how the edge moments are resisted by the bolt.

6. Under the normal condition, the containment vessel temperature is 202°F and the outer shell temperature is 80°F (page 1-39). For the accident condition, the containment vessel temperature is 390°F and the outer shell temperature is 560°F (page 1-70). Temperature differential across the cask wall should be based on temperature difference between the two shells. Provide an analysis to evaluate the temperature differential stresses in the cask for the normal and accident conditions. (Thermal analysis needs to be revised, see THERMAL, Item 1.)

7. The vibration analysis of the cask should be revised to consider: (a) the effects of the cask cavity, lead and impact limiter; (b) effects on cask attachments such as valves; (c) effects on fuel baskets and fuel elements.

8. Show that the containment vessel will not buckle under the combined loads of axial, bending, and external pressure including those from lead contraction.

30-Foot End Drop (1.7.1.1)

1. Show the derivation of the effective impact area of 1550 $in^2$ used in Equation 1.51.

2. Justify the adequacy of the use of the redwood crush strength derived from static test.

3. The redwood grain orientation is inconsistent. As shown on Drawing No. 1038-1, the redwood would be crushed parallel to grain instead of perpendicular to grain as assumed in the analysis.

4. In dynamic test, the redwood generally bottomed out at 50%-60% compression. Justify the adequacy of the current design which is based on redwood compressibility 6.27/9.5 x 100% = 66%.

5. The corrugated steel cylinders in the bottom impact limiter may have significant effects on the performance of the impact limiter. Justification for ignoring the cylinders should be provided.

30-Foot Side/Corner Drop (1.7.1.2 and 1.7.1.3)

1. Since the design is based on mixed redwood grain orientations (e.g., perpendicular to grain at the flat side, parallel to grain corner), detailed drawing showing redwood grain orientations should be provided. Redwood properties and construction procedures should also be specified on the drawings.

2. The portion of the redwood which is not supported by the cask should not be deemed effective in absorbing energy (Figure 1.14, page 1-54).

3. The average redwood crush strength used in the corner drop (page 1-60) was not justified.

4. It is not clear how the impact limiter crush angles "a" and "b" were determined. Provide the derivations of Equations 1.61 and 1.63.

5. The rationale that the redwood crush strengh varies according to the cosine of the cask rotation angle (page 1-64) was not adequately justified.

6. Provide an analysis of the cask for 30-foot drop on the top corner. Provide a free body diagram of the impacted corner to show all forces acting in that corner and equilibrium condition is satisfied.

7. The impact limiter is a square with rounded corners not a circle as assumed in the analysis. Also, the redwood grain orientations are different at the flat portions and the corners. Assess the differences for the cask to be impacted on the corner of the flat portion and the rounded corner.

8. It is noted that the lifting trunnions, tie-down lugs and valve boxes are not fully covered by the impact limiter. Provide an analysis for the cask impact directly on these attachments.

40-Inch Puncture Test (1.7.2)

1. Provide an analysis for puncture directly on the valve box cover. Equation 1.69 is not applicable because the cover plate on the valve box does not have lead backing.

2. The package should be evaluated for "beam like" stresses due to the puncture test

### THERMAL

1. Our independent thermal analysis (HEATING6, NUREG/CR-0200) indicates considerably more lead melt than is reported in the application. Provide a thermal protection system to preclude lead melt for the 1/2-hour fire test.

2. Since the cask is loaded under water, residual water may remain in the closed cask. Revise the estimates of maximum pressure for normal and accident conditions by including the partial pressure of water.

### CONTAINMENT

1. Identify and provide specifications for the new pressure relief valve (§3.1.2.2) that will replace the bronze valve described in the text and shown on the drawings.

2. Revise Paragraph 3.2.1 to reflect the actual leak test to be used.

3. Show that the pressure gauge does not violate containment for normal and accident conditions of transport.

4. The description of the valve arrangement on the vent line, as it is given in several sections, is not consistent. The description given on page C-4 agrees with Drawing Nos. 1038-1, Rev. A and 1038-9, Rev. 0. The description given on pages 3-1 and 3-3 are inconsistent and confusing.

5. The metal filter on the pressure relief valve should be deleted to preclude the possibility of plugging and not permitting the valve to function as anticipated. The filter appears to serve no useful function.

### CRITICALITY

1. Revise Tables 4.2 and 5.2 to limit the HFBR fuel to 300 grams of U-235/element rather than the 351 grams used in the tables. This revision is necessary because the number density (Tables 5.3) and geometry (Figures 5.11 and 5.12) used in the criticality analysis correspond to 300 grams of U-235/element.

2. Resolve the difference in the length of the HFBR element between Tables 4.2 (22") and 5.2 (22.75").

## SECTION 6.0 OPERATING PROCEDURES

1. Paragraph 6.1 should be modified to require a visual inspection of the Boral plates in the fuel baskets for the NBS, HFBR, and MURR fuel assemblies for each shipment. If swelling of the neutron poison plates is observed, the basket should be taken out of service.

2. The appropriate corrections should be made in the referencing of previous or subsequent procedural steps in Tables 6.2 through 6.5.

3. On page 6-15, Step 8, clarify the instruction to connect the water supply line to the relief valve. This instruction is not compatible with the Lunkenhamer relief valve.

4. Expand Step 1.b., page 6-20, to include non-destructive examination of welds which make up the steel envelope that contains the Boral plate. Inspection of the welds is necessary to preclude in-leakage of water which could subsequently result in bowing or rupture of the plates. This inspection should also be included in Section 7.0 Acceptance Tests and Maintenance Program.

5. There is no instruction to remove the bolts holding the bottom impact limiter to the cask. If the bottom impact limiter stays with the cask during the loading operation, describe the method used to remove contaminated pool water which can collect at the interface of the cask and impact limiter.

6. Either delete from the Operating Procedures the option of lifting a fuel basket containing irradiated fuel assemblies into and/or out of the cask or provide safety and structural analyses demonstrating the operation can be safely accomplished.

## SECTION 7.0 ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

1. The program should give a specific replacement schedule for all seals.

2. The program should consider the need to perform a periodic bench test of the pressure relief valve to verify pressure setting.

## IAEA APPROVAL

If the package will be used for foreign shipments (§0.1, page 0-2), provide a section in the Safety Analysis Report showing all the requirements of Safety Series No. 6, Regulations for the Safe Transport of Radioactive Materials, 1973 Revised Edition (as Amended), are met.

71-6639
PDR
Return to
[illegible]

Department of Energy
Washington, D.C. 20545

'83 APR 21 P3:53

Mr. C. E. MacDonald
Chief, Transportation Certification
Branch
Division of Fuel Cycle and
Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. MacDonald:

This refers to your letter, dated February 24, 1983, which requested information regarding the approval of the Model No. MH-1A packaging. In your letter you asked to be advised when the information will be provided.

An initial estimate indicates that it will take four (4) months to provide answers to your questions. Because of the uncertain meaning of some questions it is difficult for us to provide more specific information at this time.

In the near future one of our packaging engineers will contact you to arrange a meeting to discuss the details of your request. After this meeting we expect to be in a better position to provide you an estimate as to when we are able to provide the information you require.

If you have any questions please contact John Cece (353-5486).

Sincerely,

for
Reuben P. Prichard
Director, Safety Engineering
and Analysis Division
Office of Operational Safety

FEE EXEMPT

MAY 05 1983

FCTC: [illegible]
71-[illegible]

MEMORANDUM FOR: The Files

SUBJECT: SUMMARY OF MEETING WITH DOE CONCERNING MODEL NO. MH-1A APPLICATION DATED SEPTEMBER 7, 1982

**Attendees**

| DOE | Sandia | NRC |
|---|---|---|
| Barry A. Smith | R. B. Pope | C. E. MacDonald* |
| Harold H. Young* | A. A. Trujillo | H. W. Lee |
| Reuben P. Prichard* | | C. E. Williams |
| | | W. H. Lake |
| | | R. H. Odegaarden |

REA

Herman L. Crawford

---

*part-time

**Introduction**

A meeting was held at Silver Spring, MD on May 2, 1983 at the request of Sandia to discuss the additional information requested in our letter of February 24, 1983 concerning the review by the staff of the safety analysis report for the Model No. MH-1A cask design.

Discussion

The information requested in our February 24, 1983 letter was discussed in general and clarification [illegible] was requested. The NRC staff notes that the [illegible] may have to be redesigned to reduce the 'g' force experienced by the package. Also, it will be difficult to show the containment vessel will not buckle during fabrication or lead contraction at the -40°F and -20°F ambient temperature extremes for the normal and accident conditions of transport. Stress allowables stated in Regulatory Guide 7.5 are not applicable to buckled shells.

DOE (Sandia) discussed the possibility of responding to our request in September 1983. The additional information would be reviewed by the staff in two or three months.

Richard H. Odegaarden, Project Manager
Transportation Certification Branch
Division of Fuel Cycle and
Material Safety, NMSS

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON D.C. 20555

JAN 14 1985

FCTC:RHO
71-6639

MEMORANDUM FOR: The Files

FROM: Richard H. Odegaarden, FCTC, NMSS

SUBJECT: SUMMARY OF MEETING WITH DOE CONCERNING MODEL NO. MH-1A APPLICATION DATED SEPTMEBER 7, 1982

Attendees

| DOE | Sandia | NRC |
|---|---|---|
| Charles Mauck | Bill Wowak | C. E. MacDonald* |
| Barry Smith | | W. H. Lake |
| Liz Roybal | | H. W. Lee |
| | | C. R. Marotta |
| REA | | C. E. Williams |
| | | R. H. Odegaarden |
| Herman L. Crawford | | |

---

*part-time

Introduction

A meeting was held at Silver Spring, Maryland on January 10, 1985 at the request of the Department of Energy (DOE) to discuss responses to our request for additional information dated February 24, 1983.

Discussion

DOE has addressed all items identified in our letter of February 24, 1983. A summary of the DOE response (enclosed) was briefly discussed. As-built drawings and procedures for conducting leak tests prior to shipment should be included in the application. A detailed review on the adequacy of the response is pending formal receipt of the safety analysis report for the package. DOE expects to submit their response in February 1985. It is expected that our review would be completed within 60 days.

R H Odegaarden

Richard H. Odegaarden, Project Manager
Transportation Certification Branch
Division of Fuel Cycle and
Material Safety, NMSS

Enclosure: As stated

## ANSWERS TO NRC QUESTIONS OF FEBRUARY 24, 1983, FOR MH-1A CASK

The MH-1A safety analysis report (SAR) has been revised to reflect the change in format since the SAR was first revised by REA. Hence, the chapter numbers have been increased by one, eliminating Chapter 0. The SAR has also been revised to reflect the latest edition of 10 CFR, Part 71, effective September 6, 1983.

In the previous SAR submittal to NRC, only one type of HFBR basket (two tier) was included. Since that submittal, the need arose for a long basket for uncut HFBR fuel assemblies. A description of this basket and fuel has been integrated throughout the SAR, and an additional criticality analysis has been performed as indicated in Chapter 6. The two types of HFBR fuel assemblies are referred to as "long" and "short" HFBR fuel.

For completeness, the NRC questions are repeated herein, and the answer or a brief comment to each question is indented following each question. The answers have been incorporated into the SAR, and the SAR references are included with the answers.

### DRAWINGS

1. Drawing Nos. 1038-1 and 1038-2 do not clearly show the pertinent safety details for trunnions, tie-down lugs, valve boxes, and stiffeners. Provide drawings to show details of the construction, e.g., dimensions, sizes, locations, weldment types and dimensions, etc.

> The MH-1A drawings were revised to reflect the cask as-built condition. In some instances, for example, the tie-down lugs, additional measurements were performed on the casks to obtain the necessary information. The REA drawings that were revised are
>
> a. 1038-1, Rev. G, Sheet 1 of 1, MH-1A Sectional Views
>
> b. 1038-2, Rev. E, Sheet 1 of 1, MH-1A Shipping Cask Assembly
>
> c. 1038-9, Rev. B, Sheet 1 of 2, Material List
>
> d. 1038-9, Rev. F, Sheet 2 of 2, Material List
>
> A further description of cask details of the cover weldment, trunnions, the two valve boxes, and heat transfer fins, which also are structural stiffeners, are presented in a new drawing, REA Drawing 1038-17, Revision 0.
>
> As a result of NRC Question 1 in the Thermal Section, a fire shield will surround the body of the cask in the fin region. The fire shield is shown in a new drawing, REA Drawing 1038-18, Revision 0.
>
> The revised drawings are presented in Chapter 2, Section 2.11.2, in the SAR with the other cask drawings.

2. Revise the drawings and the material list to reflect the revised pressure relief valve.

As a result of NRC Question 3 in the Containment Section, the pressure relief valve, globe valve, pressure gauge, and associated plumbing have been eliminated from the cask. A luted pipe plug is to be installed in each of the vent and drain ports in the cask. The material list, REA Drawing 1038-9, Revision F, Sheet 2 of 2, indicates that during Revision D, Items 50 through 58 were removed from the drawing. These were the valves and plumbing named previously.

REA Drawing 1038-1, Revision G, Sheet 1 of 1, indicates that during Revision E, the aforementioned Items 50 through 58 were removed. A note in Zone E7 on this drawing refers to a new drawing, REA Drawing 1038-16, Revision 0, MH-1A Shipping Cask Assembly Modification, Top and Bottom Gauge-Box Housing, which shows a pipe plug installed in a cask port and the o-ring has been removed. Therefore, the only organic seal in the cask is the o-ring in the top cover.

The removal of the valves and plumbing from the cask has been reflected in all chapters of the SAR.

3. The fuel basket drawings should clearly state the Al cladding and $B_4C$-Al matrix thicknesses, matrix density, and composition.

REA drawings show the following information on the Boral™ and cladding in the baskets:

a. 304 stainless steel cladding, 16 gauge (0.059 inch) thick, over Boral™

b. Overall Boral™ thickness of 0.265 inch

c. 0.040-inch-thick 1100 alloy aluminum sheet Boral™ matrix cladding

d. 0.185-inch-thick $B_4$-C aluminum matrix (also 1100 alloy not shown on drawing), with 35 percent $B_4$-C and a $B^{10}$ loading of 0.045 g/cm$^2$.

The following REA basket drawings show the aforementioned information:

a. 1038-6, Rev. D, Sheet 1 of 2, Zone H5, NBSR Basket

b. 1038-7, Rev. E, Sheet 1 of 2, Zone B4, Short HFBR Basket

c. 1038-15, Rev. C, Sheet 1 of 2, Zone D1, Long HFBR Basket

d. 1038-3, Rev. C, Sheet 2 of 2, Zone A7, MURR Basket

The Boral™ as described will be used to fabricate the baskets because of availability of material, but the criticality analysis, which was completed many months ago, assumes that the Boral™ thickness is 0.177 inch. The use of thicker Boral™ is conservative; therefore, the baskets were not reanalyzed for criticality. Instead, a note was inserted in the criticality section acknowledging that the actual Boral™ thickness will be greater than that assumed in the analysis, and that the analysis was not reworked because of conservatism. In all other chapters of the SAR, the 0.265-inch thickness is discussed.

## STRUCTURAL

### General

1. Revise the analyses for the fuel baskets taking into consideration the following:

### MURR Fuel Basket

Intermediate Double Bend Plate will not be able to support the web plate force in a side drop condition (water gap, assumed in the criticality analysis, will be lost during the side drop).

> The MURR criticality was reanalyzed assuming no water gap. This resulted in an increase of $k_{eff}$ from 0.820 to 0.845. This result is presented in the SAR in Chapter 6, Table 6.1 and in Section 6.1, Discussion and Results.

### HFBR and NBSR Basket

The 0.25-inch-diameter bottom rod will not be adequate to support the fuel in the basket for the bottom drop condition.

> The previous basket drawings showed two 0.25-inch-diameter rods below each fuel assembly. This number has been increased to five (three additional rods have been added under each fuel assembly). In actuality, a rod extends continuously across a basket, which spans four fuel assembly compartments. Therefore, a total of 20 rods are installed as indicated in the following REA drawings:
>
> a. 1038-6, Rev. D, Sheet 1 of 2, Zone F3, NBSR Basket
>
> b. 1038-7, Rev. E, Sheet 1 of 2, Zone F2, Short HFBR Basket
>
> c. 1038-15, Rev. C, Sheet 1 of 2, Zone F3, Long HFBR Basket
>
> The analysis of the rods during the end drop is presented in Section 2.9.3.1 in the SAR.

2. The analysis of the tie-downs on page 1-24 is not valid and should be revised because the tie-down cable forces do not satisfy the basic equilibrium condition (i.e., balance the applied load). It is also

noted that the weldment size for the tie-down lugs shown on Drawing No. 1038-2 is not consistent with the analysis (page 1-26).

Analysis and drawing have been revised.

3. Show that the cask closure system, including the flange at the top of the cask wall, has adequate regidity to maintain a seal under the accident conditions and under excessive tie-down forces (10 CFR 71.31(d)(3)).

A detailed stress analysis presented in the Appendix, Sections 2.11-6, shows stress values for the tie-down and drop accidents.

4. For the external pressure analysis (page 1-34), justify the assumption that the end plate can be treated as fixed edge circular as in reality the end plate is neither circular nor fixed. Also, equations 1.39 and 1.40 are not applicable since they have ignored the forces at the edges where the flat sides meet the curved corner (axial, shear and moment). Bending moment effects at the corner should be considered.

The end plate in question is the top flange, which is welded to the containment vessel and outer shell. Usually, welded connections are considered fixed. To answer the circular vs. rectangular plate issue, a finite element analysis was performed, which can accommodate generalized geometric shapes.

5. The thermal differential expansion analysis presented on page 1-39 is not complete. The radial and axial pressure due to lead contraction on the containment vessel should be evaluated. Also, justify the assumption that the bolted edge of the cask cover is fixed boundary (page 1-41). Provide an analysis to show how the edge moments are resisted by the bolt.

The resistance of a single bolt ring to resist moments in bolted connections are well recognized. For example, the ASME Boiler and Pressure Vessel Code, Section III, Division I, Appendices, Articles A-2000 through A-5000, and M. Holmes, Analysis and Design of Structural Connections, John Wiley (1983), Page 145, analyze for the bending moments at bolted connections. The bolts, themselves, usually do not resist the moment, but they are in tension instead. The moment resistance is derived from the prying action of the edge of the flange. The tensile force of the bolt and the resisting force at the edge of the flange form a force couple, and the distance between the couple is the distance from the bolt to the edge of the flange.

The analysis in the Appendix, Section 2.11.6, considers the bolted connection in detail. The radial stress due to the lead is analyzed in Section 2.11.6.3. The axial stress is calculated in Section 2.6.1.2.

6. Under the normal condition, the containment vessel temperature is 202 F and the outer shell temperature is 80 F (page 1-39). For the

accident condition, the containment vessel temperature is 390 F and the outer shell temperature is 560 F (page 1-70). Temperature differential across the cask wall should be based on temperature difference between the two shells. Provide an analysis to evaluate the temperature differential stresses in the cask for the normal and accident conditions. (Thermal analysis needs to be revised, see THERMAL, Item 1).

> The thermal analysis was reanalyzed, because of incorporation of a fire shell. Thermal stresses were calculated.

7. The vibration analysis of the cask should be revised to consider: (a) the effects of the cask cavity, lead and impact limiter; (b) effects on cask attachments such as valves (c) effects on fuel baskets and fuel elements.

The effect of each component was considered separately. The analysis is presented in Section 2.6.5.

8. Show that the containment vessel will not buckle under the combined loads of axial, bending, and external pressure including those from lead contraction.

> Buckling analyses are presented in Sections 2.7.1.1.3 and 2.7.1.2.4.

30-Foot End Drop (1.7.1.1)

1. Show the derivation of the effective impact area of 1550 $in^2$ used in Equation 1.5.

> The areas on top of the cask have been recalculated, and the value is 1416 square inches, as shown in Section 2.7.1.1.1 in the SAR.

2. Justify the adequacy of the use of the redwood crush strength derived from static test.

> Static redwood crushing data is equivalent to dynamic redwood crushing data, as Sandia determined by static and dynamic test documented in Sandia Report SAND74-0010, Page 59 therein, and Exhibit 2.11-2, letter from W. W. Joseph, Section 2.11.3.4.1.4 in the SAR.
>
> The redwood crushing data used for analysis in the SAR came from REA tests on samples of the redwood used in the MH-1A impact limiters. In all instances, the curve value of crushing stress at the appropriate strain was used, instead of an average value. To estimate the maximum crushing distance of an impact limiter, the average curve value of crushing stress minus 15 percent for uncertainty was used. To estimate forces on the cask, the greatest crushing stress values were used at the end of crushing, and a band width of ±15 percent from the average curve value of crushing stress was considered. The analysis is presented in Section 2.7.1 in the SAR.

3. The redwood grain orientation is inconsistent. As shown on Drawing No. 1038-1, the redwood would be crushed parallel to grain instead of perpendicular to grain as assumed in the analysis.

> The drawing has been revised to be consistent with the analysis. Also, detailed drawings of the bottom and top impact limiters have been included in the SAR for clarity. These drawings are REA Drawings 1038-10 and 1038-11, respectively.

4. In dynamic test, the redwood generally bottomed out at 50%-60% compression. Justify the adequacy of the current design which is based on redwood compressibility 6.27/9.5 x 100% = 66%.

> The compression data for the redwood used in the impact limiters are used in the analysis. Bottoming does not occur at a sharply defined deflection.

5. The corrugated steel cylinders in the bottom impact limiter may have significant effects on the performance of the impact limiter. Justification for ignoring the cylinders should be provided.

> In the reanalysis of the bottom impact limiter, the corrugated cylinders were not ignored. Instead, the performance of the cylinders was evaluated and included in the overall performance of the bottom impact limiter. The analysis is presented in Sections 2.6.4 and 2.7.1.1.2 for the bottom end drop.

30-Foot Side/Corner Drop (1.7.1.2 and 1.7.1.3)

1. Since the design is based on mixed redwood grain orientations (e.g., perpendicular to grain at the flat side, parallel to grain on the corner), detailed drawing showing redwood grain orientations should be provided. Redwood properties and construction procedures should also be specified on the drawings.

> The detailed impact limiter drawings are included in the SAR. These drawings are REA Drawings 1038-10 and 1038-11. The PAT-2 specification, which is the one used by Sandia, is included on the impact limiter drawings.

2. The portion of the redwood which is not supported by the cask should not be deemed effective in absorbing energy (Figure 1.14, page 1-54).

> The spreading of stress in a material is well documented, for example, Spangler, M. G., Soil Engineering, 3rd ed., Intext (1973), Pages 383-385. Thus, either the outside or the inside of an impact limiter may be crushed, depending on where the smaller area is located. This is discussed in Section 2.7.1.2.1, and photographs of drops in SAND74-0010 substantiate the spreading of stress and the crushing of inside or outside surfaces of the impact limiters.

3. The average redwood crush strength used in the corner drop (page

1-60) was not justified.

> The redwood crushing data used for analysis in the SAR came from REA tests on samples of the redwood used in the MH-1A impact limiters. In all instances, the curve value of crushing stress at the appropriate strain was used, instead of an average value. To estimate the maximum crushing distance of an impact limiter, the average curve value of crushing stress minus 15 percent for uncertainty was used. To estimate forces on the cask, the greatest crushing stress values were used at the end of crushing, and a band width of ±15 percent from the average curve value of crushing stress was considered. The analysis is presented in Section 2.7.1.3 in the SAR.

4. It is not clear how the impact limiter crush angles "a" and "b" were determined. Provide the derivations of Equations 1.61 and 1.63.

> The drop accident equations and analysis are explained in Sections 2.7.1 for each type of drop.

5. The rationale that the redwood crush strength varies according to the cosine of the cask rotation angle (page 1-64) was not adequately justified.

> The cosine of the angle was not used in the reanalysis of the impact limiters. Instead, the exact curve for crushing wood at various angles with respect to the parallel-grain direction was extracted from JPL Report 32-120 (January 13, 1961), Page 7.

6. Provide an analysis of the cask for 30-foot drop on the top corner. Provide a free body diagram of the impacted corner to show all forces acting in that corner and equilibrium condition is satisfied.

> The ANSYS input data shows the locations and directions of forces applied to the corner of the cask (Section 2.11.6.5.1, Table 2.11-24).

7. The impact limiter is a square with rounded corners not a circle as assumed in the analysis. Also, the redwood grain orientations are different at the flat portions and the corners. Assess the difference for the cask to be impacted on the corner of the flat portion and the rounded corner.

> A detailed analysis of impact on a corner with a flat side is presented in Section 2.11.6.4. Since a cylinder (rounded edge and side of the cask) is stiffer than a flat side, the rounded corner can withstand the corner drop accident with less deflection than that for the flat side.

8. It is noted that the lifting trunnions, tie-down lugs and valve boxes are not fully covered by the impact limiter. Provide an analysis for the cask impact directly on these attachments.

> Impact was assumed on these components, and the loss of wood in

these regions was considered in the analysis in Section 2.7.1.

## 40-Inch Puncture Test (1.7.1)

1. Provide an analysis for puncture directly on the valve box cover. Equation 1.69 is not applicable because the cover plate on the valve box does not have lead backing.

   The valves and piping were removed from the valve boxes, and these were replaced by pipe plugs flush with the surface of the cask. Therefore, it is not necessary to show that the valve box is not damaged. The existence of the valve boxes makes puncture on these locations less severe than puncture at other places on the outer shell, because of the increased metal thickness under the puncture pin. Also, puncture on the valve boxes is less severe than in the center of the cask, because the valve boxes are near the ends of the cask and the cask tends to rotate when struck with the puncture pin. This is discussed in Section 2.7.2.

2. The package should be evaluated for "beam like" stresses due to puncture test.

   In the revised SAR, the cask is analyzed for beam-like stresses for the puncture accident, as presented in Section 2.7.2.

THERMAL

1. Our independent thermal analysis (HEATING, NUREG/CR-0200), indicates considerably more lead melt than is reported in the application. Provide a thermal protection system to preclude lead melt for the 1/2-hour fire test.

> A fire shell has been designed for the cask. Consequently, the cask has been remodeled and reanalyzed. The results are presented in Chapter 3. Lead does not melt with the fire shield installed.

2. Since the cask is loaded under water, residual water may remain in the closed cask. Revise the estimates of maximum pressure for normal and accident conditions by including the partial pressure of water.

> The operating procedures have been revised to test for water vapor with a 5 mm Hg. vacuum. The analysis of the operation of this procedure is presented in Section 7.5.3 in the SAR. The water vapor pressure has been estimated and included in the total pressure in the cask.

CONTAINMENT

1. Identify and provide specifications for the new pressure relief valve (3.1.2.2) that will replace the bronze valve described in the text and shown on the drawings.

> As a result of Question 3 in this section, all valves and plumbing, including the pressure relief valve, were removed from the cask. Therefore, this question in not applicable now.

2. Revise Paragraph 3.2.1 to reflect the actual leak test to be used.

> This paragraph, now called Paragraph 4.2.1, has been revised to show the required sensitivity required. From this value, the cask user can select an appropriate leak test from ANSI N14.5.

3. Show that the pressure gauge does not violate containment for normal and accident conditions of transport.

> The pressure gage and plumbing have been removed from the cask, rather than furnish an analysis. This change is reflected throughout the SAR.

4. The description of the valve arrangement on the vent line, as it is given in several sections, is not consistent. The description given on page 0-4 agrees with Drawing Nos. 1038-1, Rev. A and 1038-9, Rev. 0. The description given on pages 3-1 and 3-3 are inconsistent and confusing.

> As a result of the action taken as discussed in the previous question, Question 4 is not applicable now.

5. The metal filter on the pressure relief valve should be deleted to

preclude the possibility of plugging and not permitting the valve to function as anticipated. The filter appears to serve no useful function.

> As a result of the action taken as discussed in Question 3 in this section, the valves, plumbing, and filter have been removed from the cask. Therefore, this question is not applicable now.

CRITICALITY

1. Revise Tables 4.2 (now 5.2) and 5.2 (now 6.2) to limit the HFBR fuel to 300 grams of U-235/element rather than the 351 grams used in the tables. This revision is necessary because the number density (Table 5.3, now 6.3) and geometry (Figures 5.11 and 5.12, now 6.11 and 6.12) used in the criticality analysis correspond to 300 grams of U-235/element.

> The desired U-235 loading is 351 grams per fuel assembly, and the number densities have been corrected consistently through the criticality analysis, specifically in Table 6.3.

2. Resolve the difference in the length of the HFBR element between Tables 4.2 (now 5.2) (22 inches) and 5.2 (now 6.2) (22.75 inches).

> The correct length is 22.75 inches as used in the criticality analysis. The use of a shorter length (22 inches) in the shielding analysis is conservative (greater source density, which causes dose rate values to be predicted higher than actual). Therefore, the values remain as presented in the SAR.
>
> A paragraph explanation, as presented herein, is included in Section 5.3, Model Specification, in the SAR.

OPERATING PROCEDURES

1. Paragraph 6.1 (now 7.1) should be modified to require a visual inspection of the Boral™ plates in the fuel baskets for the NBSR, HFBR, and MURR fuel assemblies for each shipment. If swelling of the neutron poison plates is observed, the basket should be taken out of service.

> Section 7.1, Procedure Number 19, for loading NBSR, HFBR, and MURR fuels, requires visual inspection of the Boral™. If bulging is observed, the cause of the bulge must be determined and repaired. A test for the presence of Boral™ is required for final inspection.

2. The appropriate corrections should be made in the referencing of previous or subsequent procedural steps in Tables 6.2 through 6.5.

> To avoid confusion, these tables have been eliminated, and complete procedures are presented for typical fuel in each of the types of baskets to be shipped.

3. On Page 6-15, Step 8, clarify the instruction to connect the water

supply to the relief valve. This instruction is not compatible with the Lunkenheimer relief valve.

> Because of NRC Question 3, Containment, the valves have been removed from the cask. Therefore, this question is not applicable now.

4. Expand Step 1.b., Page 6-20, to include non-destructive examination of welds which make up the steel envelope that contains the Boral™ plate. Inspection of the welds is necessary to preclude in-leakage of water which could subsequently result in bowing or rupture of the plates. This inspection should also be included in Section 7.0 (now 8.0), Acceptance Tests and Maintenance Program.

> The MURR, long and short HFBR, and NBSR basket drawings refer to notes on the material list. Note 7 on REA Drawing 1038-9 covers liquid penetrant inspection of all new welds, which include the new baskets, except the MH-1A basket, which is existing. Therefore, the new basket welds will be liquid penetrant inspected to ensure that water does not leak between the Boral™ plates and stainless steel cladding.
>
> In Section 7.5.2, Step b (the same place NRC questioned), additional procedures have been included for visual inspection of the stainless steel cladding during the annual inspection. A visual inspection is also included before each fuel loading (NRC Question 1, Operating Procedures). Therefore, if leakage occurs, the damaged basket will be taken out of service until the leak has been repaired and the presence of Boral™ assured by testing. Moreover, liquid penetrant inspection of the small basket spaces is believed to be impossible due to the size and length of the cavity that must be inspected, but the visual inspections and test for Boral™ discussed previously will ensure the presence of critical control material.

5. There is no instruction to remove the bolts holding the bottom impact limiter to the cask. If the bottom impact limiter stays with the cask during the loading operation, describe the method used to remove contaminated pool water which can collect at the interface of the cask and impact limiter.

> The bottom impact limiter is not intended to be placed in the pool. Specific instruction to remove the bottom impact limiter is contained in Steps 6 and 9 in the revised package loading procedures for each type of fuel.

6. Either delete from the Operating Procedures the option of lifting a fuel basket containing irradiated fuel assemblies into and/or out of the cask or provide safety and structural analyses demonstrating the operation can be safely accomplished.

> The option has been deleted from the procedures. Loading the cask is an on-site function and not a transportation function. The option was inadvertently included in the previous version of the

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SAR, but it has been removed from this revision.

## ACCEPTANCE TESTS AND MAINTENANCE PROGRAMS

1. The program should give a specific replacement schedule for all seals.

> The seals consist of a silicone o-ring in the top of the cask body which seals the cover and two luted pipe plugs, one each in the vent and drain ports. Luting material is placed on the threads of the plugs every time they are installed (every shipment) as required in the operating procedures, Step 38, in the one-basket-section procedures, later in the multi-section basket procedures. The o-ring is to be replaced annually, Section 8.2.1, or as needed according to physical damage during use, Section 7.1, Step 17.

2. The program should consider the need to perform a periodic bench test of the pressure relief valve to verify pressure setting.

> The pressure relief valve has been removed from the cask. Therefore, the question is now not applicable.

## IAEA APPROVAL

If the package will be used for foreign shipments (Section 0.1, Page 0-2) provide a section in the Safety Analysis Report showing all the requirements of Safety Series No. 6, Regulations for the Safe Transport of Radioactive Materials, 1973 Revised Edition (as Amended), are met.

> The reference to the shipment of fuel from foreign countries to the United States has been deleted. Only shipments within the contiguous United States are planned.

**Department of Energy**
**Washington, D.C. 20545**

Mr. Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and Materials Safety, NMSS
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. MacDonald:

In reference to our request on February 19, 1985, for the certification of the MH-1A cask, we wish to have these additional fuels considered as authorized contents of the certificate. The fuels are uranium aluminide (UAlX) and two uranium silicides (U3Si2 and U3Si). It is expected the MH-1A will be used by the research community reactors where most of the university research reactor fuel in MTR-type elements is UAlX. However, with the development of new fuel of the LEU-type coming from the RERTR program, it is quite likely that U3Si2 and U3Si may be in use by the research reactor community.

The above fuels are comparable with the Triga fuel assembly and the HFBR assembly of the MTR fuel, as listed in the Safety Analysis Report for Packaging for the MH-1A. The fuels will utilize the same baskets and will be within the currently allowable constraints of shielding and the thermal load requirements of 1.73 kilowatts.

Should you need further information on these fuels, please contact Charles Mauck on 353-5176 or Harold H. Young on 353-3995.

Roy F. Garrison
Chief of Transportation
Operations and Traffic Division
Defense Programs

**Department of Energy**
**Washington, D.C. 20545**

Mr. Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and Material Safety
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. MacDonald:

Enclosed are six copies of the following documents for USA/6639/BF (DOE/AL), the MH-1A spent fuel cask:

1. DOE Certificate of Compliance;
2. Safety Analysis Report for Packaging (SARP); and
3. Answers to NRC questions of February 24, 1983, for MH-1A cask.

Copies of the first two documents were transmitted to you in September 1982 for review. Your reply of February 24, 1983, posed a number of questions and requested additional information. The questions have now been answered and the necessary changes incorporated in the cask and SARP.

There are currently several NRC licensees, specifically research reactors at several universities, who desire to use this cask for the shipment of fuel from their reactors. To accommodate their usage of the cask and other licensees who may have a need, it is requested that NRC review these documents for compliance with the requirements of 10 CFR 71 and, upon your approval, issue a certificate of compliance to the Department of Energy.

Please advise C. J. Mauck, 353-5176, should you need further information.

Sincerely,

Roy F. Garrison
Chief of Transportation
Operations and Traffic Division
Defense Programs

[illegible]

US DEPARTMENT OF ENERGY
**CERTIFICATE OF COMPLIANCE**
For Radioactive Materials Packages

| 1a. Certificate Number | 1b. Revision No. | 1c. Package Identification No. | 1d. Page No. | 1e. Total No. Pages |
|---|---|---|---|---|
| 6639 | 2 | USA/6639/BF(DOE/AL) | 1 | 3 |

2. PREAMBLE

2a. This certificate is issued to satisfy Sections 173.393a, 173.394, 173.395, and 173.396 of the Department of Transportation Hazardous Materials Regulations (49 CFR 170-189).

2b. The packaging and contents described in item 5 below, meets the safety standards set forth in Subpart C of Title 10, Code of Federal Regulations, Part 71, "Packaging of Radioactive Material for Transport and Transportation of Radioactive Material Under Certain Conditions."

2c. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. This certificate is issued on the basis of a safety analysis report of the package design or application—

(1) Prepared by (Name and address):
Ridihalgh, Eggers & Associates
2219 Summit Street
Columbus, OH 43201

(2) Title and identification of report or application:
Safety Analysis Report
of TRIGA and MTR Irradiated Fuel Assemblies in
MH-1A Spent-Fuel Shipping Cask

(3) Date: May 1984

4. CONDITIONS
This certificate is conditional upon the fulfilling of the requirements of Subpart D of 10 CFR 71, as applicable, and the conditions specified in item 5 below.

5. Description of Packaging and Authorized Contents, Model Number, Fissile Class, Other Conditions, and References

a. Packaging

(1) Model No: MH-1A

(2) Description

The packaging is formed by two 304 stainless steel shells whose cavity is filled with 7 5/8 inches of lead. The 0.62 inch thick stainless steel containment vessel is rectangular in cross section (14.75 by 17.0 inches and is 52.0 inches high). The external dimensions of the 0.5 inch thick stainless steel outer shell is 32.25 by 34.50 inches in cross section and is 71.0 inches high over the cover. The overall narrowest cross-sectional width of the cask is 38.62 inches over the 3 inch high stainless steel fins and 0.12 inch stainless steel fire shell. The widest overall dimension for shipment is 57.75 inches over the top impact limiter. The overall shipping height is 93.5 inches between the end surfaces of the impact limiters, but including the top impact limiter lift eyes, the overall height is 98.0 inches. The cask cover is a recessed plug-type

(Cont'd)

6a. Date of Issuance: January 7, 1985

6b. Expiration Date: January 30, 1990

FOR THE U.S. DEPARTMENT OF ENERGY

7a. Address (of DOE Issuing Office):
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87115

7b. Signature, Name, and Title (of DOE Approving Official):
Carlos E. Garcia, Director
Environment, Safety & Health Division

C E Garcia

JAN 9 1985

5. b. Packaging (Cont'd)

| Fuel | Fuel Fuel Assembly Type | Maximum Number of Fuel Assemblies per Package |
|---|---|---|
| TRIGA | - | 48 |
| MTR | MURR | 12 |
| MTR | HFBR (short) | 32 |
| MTR | HFBR (long) | 16 |
| MTR | NBSR | 24<br>(48 half assemblies) |

Fuel is shipped dry, and air is the coolant in the containment vessel. Full or half-full assemblies of MTR type fuel may be transported in any mixture if it fits within a basket compartment. However, if shorter fuel assemblies are shipped, dunnage must be added so that the length of the fuel assemblies and the dunnage is within 0.5 inch of the length of the fuel for which the basket was designed. Placement of all sections of the baskets, whether two or three axial sections is mandatory regardless of whether all are filled with fuel. For partial fuel loads, fuel elements should be loaded into the outer periphery of the basket.

Mixed fuel of low and high burnup may be shipped subject to meeting the limiting constraints of shielding and the cask thermal load of 1.73 kilowatts.

Fissile Class III

Maximum number of packages per shipment is two (2).

nominal design pressure of the containment is 25 psig.

Maximum allowable decay heat is 1.74 KW.

Radiation levels must meet the requirements of 49 CFR 173.441.

5. a. Packaging (Cont'd)

lead-filled stainless steel weldment with a silicone rubber O-ring seal. Twenty ASTM A-325, type 3 studs of 0.75 inch diameter secure the cover flange to the cask body.

The cask is also equipped with a drain line, a vent line, two impact limiters, and four tiedown lugs. Both top and bottom impact limiters are fabricated of redwood and sheathed in 0.25 inch thick steel plate. An annual check for moisture inside the impact limiters is required and is further discussed in Section 8.2.7 of the SARP.

Decay heat is removed from the outer shell by 42 stainless steel fins and a fire shell. The fins are 0.25 inch thick, 3 inches high, and 60.0 inches long. The longitudinal (axially-oriented) fins are rectangular in cross section and welded radially at centerline spacings of 2.62 and 2.75 inches on the shorter and longer sides of the cask, respectively. The fire shell surrounding the fins is spaced 0.06 inch from tips of the fins by 0.06 inch diameter wire welded at 6 inch intervals vertically along the tips of the fins.

The inner containment cavity is 14.75 inches wide, 17.00 inches deep, and 52.00 inches high. A cruciform shaped Boral-stainless steel basket partitions the inner cavity for TRIGA fuel. Three other baskets containing Boral-stainless steel partitions and which may be used to transport fuel assemblies include the MFBR, NBSR and MURR baskets.

The maximum total shipping weight is 28,000 pounds for each package.

(3) Drawings

The packaging is constructed in accordance with Drawing Numbers NEA 1038-1 through 1038-9, 1038-17 and 1038-18.

b. Authorized Contents

(1) Fresh or irradiated $UO_2$ fuel in MTR or TRIGA fuel assemblies.

Maximum Numbers of Fuel Assemblies per Package

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

FCTC:RHO
71-6639

MAY 2 2 1985

MEMORANDUM FOR: The Files

FROM: Richard H. Odegaarden, FCTC, NMSS

SUBJECT: SUMMARY OF MEETING WITH DOE CONCERNING MODEL NO. MH-1A APPLICATION DATED FEBRUARY 19, 1985

## Attendees

| DOE | DOT | BNL | Sandia | NRC |
|---|---|---|---|---|
| D. Leclaire | L. Santman | J. Weeks | W. Wowak | R. Cunningham |
| C. Caves | R. Rawl | P. Tichler | | C. MacDonald |
| R. Garrison | E. Economides | | | R. Odegaarden |
| C. Mauck | | | | C. Chappell |
| K. Elliott | | | | H. Lee |
| H. Crawford (consultant) | | | | J. Cook |

## Introduction

A meeting was held at Silver Spring, Maryland, on May 21, 1985, at the request of the Nuclear Regulatory Commission (NRC) to discuss preliminary findings of the NRC staff's structural review of the application for the Model No. MH-1A package.

## Discussion

The enclosed comments on the structural analysis were discussed. DOE indicated that they would further assess our comments and take appropriate action in the interim.

Charles T MacDonald for
Richard H. Odegaarden
Transportation Certification Branch
Division of Fuel Cycle and
Material Safety, NMSS

Enclosure: As stated

Agenda
Meeting on Application for NRC Certification
Model No. MH-1A Package
Docket No. 71-6639
May 21, 1985

## The Problem

The premise upon which the application is based is that the package will retain all contents, including radioactive gases, following the accident condition tests in 10 CFR 71. Although this approach might not be the only way in which the package could be demonstrated to meet 10 CFR 71, the analysis in the application is intended to demonstrate that the package will remain leak-tight. The staff's preliminary finding is that the structural portion of the analysis contained in the application is defective and does not provide a basis to support the conclusions drawn in the application. Attached is a summary which identifies, in abbreviated form, our principal comments on the structural analysis.

The staff is aware that the Model No. MH-1A package is presently being used to ship DOE irradiated fuel under a DOE certification. The staff believes it is likely that the analytical basis of the DOE certification is similar to, if not the same as, the one contained in Docket No. 71-6639. Accordingly, the staff also believes it is obliged to draw to the attention of appropriate DOE and DOT officials its present conclusions about the structural analysis.

## Purpose of Meeting

The staff is aware that our comments on the structural analysis could have a disruptive effect on the present DOE shipping campaign. Therefore, the purpose of this meeting is to review the issues with the engineers responsible for the structural analysis in the application to determine if there is additional information or clarifications which would cause the staff to change its present conclusions.

## Summary of Deficiencies in the Structural Evaluation

1. The application specifies criteria for allowable stresses but many of the calculated stresses exceed those criteria.

2. The application does not analyze the cask for various normal and accident conditions which could produce governing stress (e.g., 2-foot free drop, 30-foot oblique impact condition).

3. The application does not consider the combined effect of all the loads which act simultaneously on the containment vessel (e.g., impact and hot or cold ambient temperatures).

4. The buckling evaluation in the application is not adequate to show that the containment vessel would not buckle under 30-foot drop test conditions. The evaluation does not consider possible inelastic buckling even though stresses in the shell were calculated to be above yield. The application also does not consider the combined effect of all the loads which act simultaneously.

5. The application does not report the stresses in the closure bolts or in the drain/vent lines which pass through the lead shielding.

6. The application does not analyze the stresses in the bottom end plate of the cask or in the bottom plate of the containment vessel.

7. The application does not consider potential displacement of shielding due to "lead slump."

8. The puncture evaluation does not consider potential collapse of the top closure plate or the bottom end plate.

9. The analysis of structural interaction between the lead shielding and the containment vessel does not consider the lateral pressure exerted by the lead against the containment vessel under 30-foot drop or differential thermal expansion and contraction.

10. The finite element analysis and the stress calculations do not provide sufficient information for review. The assumptions and inputs such as element properties, loads, and loading distributions were not described in detail and justified.

11. Static properties were used to analyze the redwood impact limiters for drop orientations where the redwood is crushed perpendicular to the grain. Information in a Sandia Laboratories report indicates the dynamic properties could be substantially different. Selection of the static properties for the analysis should be justified.

MAY 2 2 1995

Mr. David B. Leclaire, Director
Office of Defense Waste and
  Byproducts Management
U.S. Department of Energy
Mail Stop A-358 GTN
Washington, DC 20545

Dear Mr. Leclaire:

This is to confirm matters which we brought to your attention in a meeting on May 21, 1985, concerning the Model No. MH-1A package.

As you know, we are currently reviewing an application for NRC certification of the Model No. MH-1A package. The premise upon which the application for NRC certification is based is that the package will retain all contents, including radioactive gases, following the accident condition tests in 10 CFR Part 71, Packaging and Transportation of Radioactive Material. Although this approach might not be the only way in which the package could be demonstrated to meet 10 CFR Part 71, the analysis in the application is intended to demonstrate that the package will remain leak-tight. As discussed during the May 21 meeting, our preliminary finding is that the structural portion of the analysis, as documented in the application, is defective. It does not provide a basis to support the conclusions drawn. Enclosed is a summary which identifies, in abbreviated form, our principal comments on the structural analysis.

We appreciate the prompt attention and action you are taking with respect to this matter. If you have further information about the structural analysis or further questions about the issues which you would like to discuss, we will be pleased to do so.

Sincerely,

Original Signed by
Richard E. Cunningham

Richard E. Cunningham, Director
Division of Fuel Cycle and
  Material Safety

## Summary of Deficiencies in the Structural Evaluation

1. The application specifies criteria for allowable stresses but many of the calculated stresses exceed those criteria.

2. The application does not analyze the cask for various normal and accident conditions which could produce governing stress (e.g., 2-foot free drop, 30-foot oblique impact condition).

3. The application does not consider the combined effect of all the loads which act simultaneously on the containment vessel (e.g., impact and hot or cold ambient temperatures).

4. The buckling evaluation in the application is not adequate to show that the containment vessel would not buckle under 30-foot drop test conditions. The evaluation does not consider possible inelastic buckling even though stresses in the shell were calculated to be above yield. The application also does not consider the combined effect of all the loads which act simultaneously.

5. The application does not report the stresses in the closure bolts or in the drain/vent lines which pass through the lead shielding.

6. The application does not analyze the stresses in the bottom end plate of the cask or in the bottom plate of the containment vessel.

7. The application does not consider potential displacement of shielding due to "lead slump."

8. The puncture evaluation does not consider potential collapse of the top closure plate or the bottom end plate.

9. The analysis of structural interaction between the lead shielding and the containment vessel does not consider the lateral pressure exerted by the lead against the containment vessel under 30-foot drop or differential thermal expansion and contraction.

10. The finite element analysis and the stress calculations do not provide sufficient information for review. The assumptions and inputs such as element properties, loads, and loading distributions were not described in detail and justified. Although this does not constitute a fault with the analysis itself, the method of presentation is such that we cannot assess adequacy.

11. Static properties were used to analyze the redwood impact limiters for drop orientations where the redwood is crushed perpendicular to the grain. Information in a Sandia Laboratories report indicates the dynamic properties could be substantially different. Selection of the static properties for the analysis might or might not be appropriate but should be justified in light of the Sandia Laboratories report.

US Department
of Transportation

Research and
Special Programs
Administration

400 Seventh Street S.W.
Washington D.C. 20590

MAY 23 1985

Mr. Ronald W. Cochran
Deputy Assistant Secretary
for Nuclear Materials
U. S. Department of Energy
Washington, DC 20545

Dear Mr. Cochran:

Earlier this year you met with Administrator Cindy Douglass to discuss the Department of Energy's (DOE) plans to commence transportation of spent nuclear fuel from Brookhaven National Laboratory on Long Island, New York, to Idaho Falls, Idaho. At that time, you discussed several topics of mutual interest, including certain questions which the Nuclear Regulatory Commission (NRC) had raised concerning the MH-1A cask which had been certified by DOE using the NRC performance standards set forth in 10 CFR Part 71.

By letter dated January 17, 1985, you stated that NRC representatives had agreed that all questions had been positively addressed in a meeting with members of your staff. Accordingly, the MH-1A cask was delivered to Brookhaven and transportation commenced shortly thereafter.

The Department of Transportation's (DOT) willingness to provide regulatory recognition of DOE-approved package designs is based on the premise that the DOE evaluation and approval process will provide an assurance of safety equivalent to that required by the NRC. Such assurance can be provided only by:

1. Requiring that DOE package designs meet the standards of 10 CFR Part 71 or their equivalent; and
2. Ensuring that the evaluation methods used to demonstrate compliance with the standards are equivalent to those used by NRC in their evaluation of commercial package designs.

The requirement of 49 CFR 173.7(d) is very clear on the first point, allowing the use of DOE-approved packagings only when "...evaluated, approved, and certified by the Department of Energy against packaging standards equivalent to those specified in 10 CFR Part 71." The second point is implicit and inescapable since equivalent safety can only be assured through the use of equivalent evaluation techniques and methodologies. Additionally, DOE has always maintained that its evaluation techniques and methodologies are at least equivalent to those of NRC.

The case of the MH-1A cask design has raised questions concerning the equivalence of these evaluation processes and DOE's compliance with section 173.7(d). On May 21, 1985, I participated in a meeting with representatives of both DOE and

NRC to discuss some of the concerns which NRC had expressed earlier this year. Although these questions had been addressed earlier, it appears that they have yet to be resolved. The essence of the meeting was stated succinctly in Mr. Richard E. Cunningham's letter of May 22, 1985, to Mr. David B. Leclaire (enclosed). The premise upon which DOE based its application for NRC certification of the MH-1A cask is that it provides a level of safety far in excess of that which is actually required for the type of wastes being transported from Brookhaven. As Mr. Cunningham pointed out, this approach might not be the only way in which DOE could demonstrate that the MH-1A cask meets the standards of 10 CFR Part 71. But having taken that approach, DOE must provide the analysis to support its premise. It is this underlying analysis which NRC has preliminarily found to be defective.

Since DOE has asked NRC for an evaluation and the NRC has responded with substantial reservations, DOT must conclude that serious questions exist as to the "equivalence" of the evaluation on which DOE based its certification of the MH-1A cask. Clearly, NRC concerns must be resolved before equivalence is assured to any degree. This will require that DOE respond to the NRC concerns and withdraw the cask from service until NRC has formally agreed with the resolution of the issues.

I understand that DOE, upon being notified of NRC's concerns, voluntarily postponed a planned shipment from Brookhaven which was to have used the MH-1A cask. Pending resolution of those concerns, DOE may wish to continue the Brookhaven shipping campaign using casks other than the MH-1A. I further understand that DOE is giving consideration to revising its application for NRC certification by seeking separate approvals for: (1) use of the cask for Brookhaven-type wastes; and (2) use of the cask as set forth in the original application. This is an eminently reasonable course of action.

I am sure you appreciate the seriousness of this situation and request that you keep me informed of DOE's actions to resolve the issue.

Sincerely,

L. D. Santman, Director
Materials Transportation Bureau

Enclosure

FCTC:RHO
71-6639

MAY 3 1 1985

Department of Energy
ATTN: Mr. Roy F. Garrison
DP-122.2
Washington, DC 20545

Gentlemen:

This refers to your application dated February 19, 1985, requesting approval of the Model No. MH-1A package.

In connection with our review, we need the information identified in the enclosure to this letter.

Please advise us within 30 days from the date of this letter when this information will be provided. The additional information requested by this letter should be submitted in the form of revised pages. If you have any questions regarding this matter, we would be pleased to meet with you and your staff.

Sincerely,

Original Signed by
CHARLES E. MACDONALD

Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and
Material Safety, NMSS

Department of Energy
Model No. [illegible]-1P Package
Docket No. 71-6639

MAY 3 1 1985
Encl to ltr dtd:

STRUCTURAL

1. On page 2.1-3, the application specifies allowable stress criteria for the cask. However, the application does not show that the stresses in the cask meet this criteria. Many of the stresses reported in the application exceed allowable values. The application should show explicitly that the stresses in the cask are within allowable limits under both normal and accident conditions. Regulatory Guides 7.6 and 7.8 may be helpful in this regard. Also, note that certain bending stresses at the edge joint of the square pressure vessel should be classified as primary stresses (see definition of Secondary Stress in Regulatory Guide 7.6).

2. The discussion presented in the application for oblique drop is not adequate. The application should evaluate the stresses that would be produced under oblique impact orientations and by secondary impact and show explicitly that these stresses are within allowable limits. Also, because the cask is not a shell of revolution, the application should evaluate the cask in the most damaging angular orientation about its longitudinal axis (i.e., the effects produced by rotating the square containment vessel).

3. The application does not consider the combined effect of all the loads which act simultaneously on the containment vessel. For example, the impact analysis should consider the combined effects of impact and ambient temperature (differential thermal expansion/contraction). Regulatory Guide 7.8 specifies an acceptable set of load combinations.

4. The application does not adequately consider the following loads in evaluating stresses in the containment vessel:

   a. The lateral pressure that would be exerted by the lead against the containment vessel under 30-foot end, corner, and obluque orientations (the horizontal spring used in the anslysis does not adequately model this phenomena).

   b. The axial stresses that would be produced by differential thermal expansion/contraction of the inner shell, lead shielding, and the outer shell.

   c. The lateral pressure that would be exerted by the lead against the containment vessel due to differential thermal contraction at the -40°F and -20°F temperature conditions specified in 10 CFR §§71.71 and 71.73.

5. The buckling evaluation in the application is not adequate to show that the inner shell does not buckle under 30-foot drop test conditions.

   a. The application does not consider possible inelastic buckling (note that stresses in the shell were calculated to be above yield).

   b. The application does not consider the combined effect of all loads that would be acting simultaneously on the containment vessel shell (e.g., impact forces, moments, and shear, lateral pressure of the lead due to impact, and axial and lateral differential thermal expansion/contraction).

   c. The application does not specify a factor of safety against buckling or show the interaction equations that will be used to evaluate the combined effects of different types of loads acting simultaneously.

6. The presentation of the finite element analysis is not clear in that many important aspects of the analysis has not been discussed in detail. All assumptions should be stated clearly and justified. Additional information is needed as follows:

   a. Justify the finite element model adequately represents the cask. Discuss in detail the capabilities of each type of element selected for the model including the input requirements and output obtained.

   b. Justify the boundary conditions used at the horizontal centerline of cask where all nodes are constrained in all directions for all loading conditions.

   c. Identify the mechanical and material properties used in the analysis for the elements of the model.

   d. Identify the loads and the distribution of loading in each analysis.

   e. Identify the procedure to combine different loads (i.e., R.G. 7.8 load combinations).

   f. Provide the rationale of using the average element stress at nodal points instead of using the element stresses directly. The procedure for averaging stresses at the node where two or more elements connected together is confusing and should be explained in more detail. For instance, it is not clear how the average stresses are derived for different types of elements connected together or for elements that do not intersect each other in the same plane (i.e., outer shell and the fins). In addition, the procedure to derive principal stresses and stress intensities at each location should be identified.

7. Based on dynamic and static test results reported in Sandia Laboratorys' Report No. SLA-74-0159, we believe the redwood crushing stress used in the impact limiter analysis is non-conservative for redwood crushed perpendicular or at an angle to its wood grain. Judging from the assumptions made for redwood crushed area and the compressibility, it is clear that the small safety margin does not provide adequate assurance to prevent redwood bottom-out before all the impact energy is dissipated. In addition, there are reasons to believe that the embedded corrugated cylinders will increase the impact force significantly higher than stated in the application.

8. The application does not analyze the cask for normal transport conditions which could produce governing stress.

9. The application does not report the stresses in the closure bolts or in the drain/vent lines which pass through the lead shielding.

10. The application does not consider potential displacement of shielding due to "lead slump."

11. The puncture evaluation does not consider potential collapse of the top closure plate or the bottom end plate.

12. The application does not analyze the stresses in the bottom end plate of the cask or in the bottom plate of the containment vessel.

THERMAL

The emissivity values chosen for the stainless steel appear to be low. Provide the reference items to justify these values.

OPERATING PROCEDURES

1. Step 42 on pages 7.1-10, 19, and 20; Step 45 on page 7.1-32; and Step 50 on page 7.1-47 provide instructions relative to monitoring cask surface temperature prior to shipment to verify compliance with §71.43(g). The accessible cask surface, when the cask is assembled for shipment, is the fire shell. Discuss the rationale for selecting a location above the fire shell to monitor cask surface temperature.

2. In Section 7.3.1, Steps 1, 3, 4, and 5 are not consistent with the conditions being discussed.

ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

1. An instruction should be added to the second paragraph in Section 8.2, Maintenance Program, requiring a check on the moisture content of the wood whenever the steel sheathing has been breached. An acceptance criteria should be given.

2. Paragraph 8.2.7, Miscellaneous, should be expanded to require a check on the moisture content of the wood if initial inspection reveals moisture in the steel sheathing.

URANIUM ALUMINUM AND SILICIDE FUELS

Your request of April 15, 1985, concerning additional fuel types should be incorporated into the safety analysis for the package. This should include a physical description of the fuel and reactivity analyses as may be appropriate.

Department of Energy
Washington, D.C. 20545

JUN 18 1985

Mr. Richard E. Cunningham, Director
Division of Fuel Cycle and Material Safety
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Cunningham:

Thank you for your letter of May 22, 1985, which confirms your request f further information pursuant to renewal of the Nuclear Regulatory Commis (NRC) Certificate of Compliance 6639 for the MH-1A spent nuclear fuel shipping cask.

We appreciate the very thorough efforts of your staff in its continuing review of the revised Safety Analysis Report for Packaging (SARP), which presented to you, included several modifications in response to earlier comments on an earlier publication of this SARP. Your request for addit information is now under review by this Department, as well as another approach as you suggested to demonstrate that the package meets 10 CFR Part 71.

The Department of Energy desires to make this cask available to several licensees (university research reactors). We plan to furnish the additi information as requested in the near future.

Sincerely,

for David B. Leclaire, Director
Office of Defense Waste
and Byproducts Management
Defense Programs

Agenda
Meeting on Application for NRC Certification
Model No. MH-1A Package
Docket No. 71-6639
May 21, 1985

## The Problem

The premise upon which the application is based is that the package will retain all contents, including radioactive gases, following the accident condition tests in 10 CFR 71. Although this approach might not be the only way in which the package could be demonstrated to meet 10 CFR 71, the analysis in the application is intended to demonstrate that the package will remain leak-tight. The staff's preliminary finding is that the structural portion of the analysis contained in the application is defective and does not provide a basis to support the conclusions drawn in the application. Attached is a summary which identifies, in abbreviated form, our principal comments on the structural analysis.

The staff is aware that the Model No. MH-1A package is presently being used to ship DOE irradiated fuel under a DOE certification. The staff believes it is likely that the analytical basis of the DOE certification is similar to, if not the same as, the one contained in Docket No. 71-6639. Accordingly, the staff also believes it is obliged to draw to the attention of appropriate DOE and DOT officials its present conclusions about the structural analysis.

## Purpose of Meeting

The staff is aware that our comments on the structural analysis could have a disruptive effect on the present DOE shipping campaign. Therefore, the purpose of this meeting is to review the issues with the engineers responsible for the structural analysis in the application to determine if there is additional information or clarifications which would cause the staff to change its present conclusions

## Summary of Deficiencies in the Structural Evaluation

1. The application specifies criteria for allowable stresses but many of the calculated stresses exceed those criteria.

2. The application does not analyze the cask for various normal and accident conditions which could produce governing stress (e.g., 2-foot free drop, 30-foot oblique impact condition).

3. The application does not consider the combined effect of all the loads which act simultaneously on the containment vessel (e.g., impact and hot or cold ambient temperatures).

4. The buckling evaluation in the application is not adequate to show that the containment vessel would not buckle under 30-foot drop test conditions. The evaluation does not consider possible inelastic buckling even though stresses in the shell were calculated to be above yield. The application also does not consider the combined effect of all the loads which act simultaneously.

5. The application does not report the stresses in the closure bolts or in the drain/vent lines which pass through the lead shielding.

6. The application does not analyze the stresses in the bottom end plate of the cask or in the bottom plate of the containment vessel.

7. The application does not consider potential displacement of shielding due to "lead slump."

8. The puncture evaluation does not consider potential collapse of the top closure plate or the bottom end plate.

9. The analysis of structural interaction between the lead shielding and the containment vessel does not consider the lateral pressure exerted by the lead against the containment vessel under 30-foot drop or differential thermal expansion and contraction.

10. The finite element analysis and the stress calculations do not provide sufficient information for review. The assumptions and inputs such as element properties, loads, and loading distributions were not described in detail and justified.

11. Static properties were used to analyze the redwood impact limiters for drop orientations where the redwood is crushed perpendicular to the grain. Information in a Sandia Laboratories report indicates the dynamic properties could be substantially different. Selection of the static properties for the analysis should be justified.

Department of Energy
Washington, D.C. 20545

JUN 18 1985

Mr. Richard E. Cunningham, Director
Division of Fuel Cycle and Material Safety
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Cunningham:

Thank you for your letter of May 22, 1985, which confirms your request for further information pursuant to renewal of the Nuclear Regulatory Commission (NRC) Certificate of Compliance 6639 for the MH-1A spent nuclear fuel shipping cask.

We appreciate the very thorough efforts of your staff in its continuing review of the revised Safety Analysis Report for Packaging (SARP), which, as presented to you, included several modifications in response to earlier NRC comments on an earlier publication of this SARP. Your request for additional information is now under review by this Department, as well as another approach as you suggested to demonstrate that the package meets 10 CFR Part 71.

The Department of Energy desires to make this cask available to several NRC licensees (university research reactors). We plan to furnish the additional information as requested in the near future.

Sincerely,

David B. Leclaire, Director
Office of Defense Waste
  and Byproducts Management
Defense Programs

Mr. **Florio.** We are very pleased, Mr. Borough President, to hear from you. Likewise your role in addressing this subject has been brought to our attention.

### STATEMENT OF HON. DONALD R. MANES

Mr. **Manes.** Thank you very much, Congressmen Ackerman and Manton. I saw an old friend from the city council.

Any area as big and diverse as the New York metropolitan region has its share of problems. Our challenge as public officials is to minimize those problems and help people live full and productive lives.

But when Government shirks its responsibility and permits hazardous waste to travel through the most densely populated city in the country—in casks of questionable quality—we need to seriously reexamine our policies and priorities.

The transportation of nuclear waste through New York City from the Brookhaven National Laboratory on Long Island poses significant risks to more than 5 million people. It also defies logic, especially since safer transportation routes exist.

Good public policy dictates that hazardous nuclear waste should be steered clear of the largest city in the United States to lessen the potential danger should there ever be a leakage of radioactive material.

Simply put, transporting the waste through less populated areas reduces this risk.

Unfortunately, the U.S. Department of Transportation and the U.S. Department of Energy have ignored the pleas of hundreds of public officials and technical experts to halt all shipments through the New York City area until a safer mode of transportation is identified.

I want to thank you, Mr. Chairman, for holding this hearing so that Congress and the American people can hear the full story behind nuclear waste transportation through the New York metropolitan area.

Your courtesy, understanding and cooperation is deeply appreciated. I think your constituents should be proud of your service to the district and our Nation.

This hearing will provide clear evidence of the irresponsible and callous attitude taken by Federal agencies when the well-being of millions of New Yorkers is at stake.

I also want to thank the Queens congressional delegation for its cooperation and commitment to the fight against nuclear waste transport through our city. I especially want to thank Congressman James Scheuer, who has devoted a great deal of time and energy to the cause of safe waste disposal.

The transportation of nuclear waste through New York City is hardly a new issue. In fact, the debate began about a decade ago when Congress passed the Hazardous Materials Transportation Act [HMTA]. It gave the DOT the power—and the obligation—to protect the public against the risks posed by the transport of nuclear materials.

In 1976, shortly after the enactment of this legislation, New York City amended its health code to prohibit the transportation of nuclear waste from Brookhaven through the city. Over 200 other States and localities followed New York City's lead and passed legislation banning or regulating the transportation of nuclear materials through their respective jurisdictions.

The same day that New York City amended its health code, the Federal Government went to court to block it and lost. Following that defeat, the DOT introduced HM-164.

New York City sued in Federal district court to have HM-164 invalidated. Judge Sofaer ruled that HM-164 violated the Hazardous Materials Transportation Act and the National Environmental Policy Act by preempting State and local bans on the transportation of radioactive materials along highways in densely populated areas.

On appeal, the decision was reversed by the Court of Appeals for the Second Circuit. In February 1984, the Supreme Court dismissed the city's appeal, clearing the way for shipments to begin.

There are no easy answers to the problem of nuclear waste disposal. You are all aware that this country, despite enormous increases in nuclear research and the number of commercial nuclear plants, still lacks a national policy for disposing of its nuclear waste.

For the past several months, trucks have been carrying irradiated nuclear fuel through the most densely populated area in the country, and on some roads that give commuting in New York City a bad name.

The trucks begin on the Long Island Expressway in eastern Long Island and proceed west through Suffolk Nassau, and Queens Counties. They move north through Queens on the Clearview Expressway and into the Bronx over the Throgs Neck Bridge. One stretch of the trucking route—a section of Interstate 95 in the Bronx—has been dubbed "Blood Alley" for its high incidence of traffic accidents.

After the bridge, the trucks travel through the Bronx on Interstate 95 and then to the Cross Westchester Expressway, route 287. They finally leave the New York City area when they cross the Tappan Zee Bridge.

At the risk of understatement, such a transportation route creates problems. You need not be a nuclear physicist to know that the possibility of accident, sabotage or even terrorism is greatest in our most heavily populated areas.

And remember that New York is one of the few urban centers that does not have a beltway bypassing its center. Trucks traveling along the present New York route are in much greater proximity to densely populated areas than in other cities.

In addition, there are serious questions about the safety and crashworthiness of the casks used to transport the waste from Brookhaven. Recent actions by the Department of Energy requiring not one, but two changes in the casks, underscore some serious questions about their safety. The public has a right to some answers.

The MH-1A cask, which was used for most of the early shipments from Brookhaven, is 24 years old, and contrary to the claims made by the DOE, it has not performed well under simulated crash conditions.

Consider too that these same casks were never certified by the Nuclear Regulatory Commission, despite Federal requirements that certification standards for the DOE and the NRC be equivalent.

This flagrant disregard for the safety of millions by Federal agencies is just one example of the irresponsible decisionmaking underlying nuclear waste transport policy.

The problems with the casks do not end there. The DOE replaced the MH-1A cask with an NRC-certified GE-700 cask. But the new cask is even smaller than before. It only holds 9 rods, compared to the MH-1A's capacity of 32.

DOE has proposed to modify the GE-700 by increasing its storage capacity to 20 rods. Before the GE-700 is permitted on any highway, I believe it is only prudent to test the quality of the new, modified cask.

DOE does not think so, however. It fully intends to put the modified GE-700 back on our highways in less than a month—hardly enough time to conduct a responsible test. And so, the saga of the casks continues.

But the risks we face go beyond the casks. Have we given adequate consideration to the possibility of sabotage or terrorist attack? The American public knows all too well that anti-American and international terrorism is on the rise. How can we continue to jeopardize the well-being of millions by providing a prime target to lunatics?

It simply does not make sense, nor has the question of emergency preparedness been adequately addressed. According to New York City's Environmental Protection Commissioner, Joseph McGough, who you will hear from later, more people would be killed trying to leave the scene of a nuclear accident in New York City than would die from actual contamination. This does not diminish the danger of nuclear waste. It simply points to the difficulty, if not the impossibility, of evacuating a city the size of New York.

Such a scenario need never occur. Safer alternatives do exist. First, the US Department of Transportation should grant New York City its nonpreemption application. This application or waiver would, in effect, give New York City the power to determine the route to be taken by nuclear waste shipments. Currently the DOT has that power.

Scores of public officials and technical experts have provided evidence to the DOT about the risks associated with trucking nuclear waste through New York City. The DOT must acknowledge this danger and grant New York City its waiver application. In a 1-week period this past June, in Queens County alone, over 15,000 citizens signed petitions requesting a halt of the shipping.

A comprehensive study by Arthur D. Little, Inc., a recognized expert in the field of transportation and risk analysis, supported New York City's request for nonpreemption. Its investigation showed that there are several safer alternatives to trucking the waste on city roads.

All the alternatives involve water transportation—either by barge or ferry—across Long Island Sound to Connecticut, thus bypassing the heavily populated areas in Long Island, Queens, the Bronx, and Westchester. Most importantly, these alternatives provide a greater level of protection to the public than the DOT route, with no additional burden on commerce.

A few of Arthur D. Little's findings are worth noting, especially since the study was done in accordance with the U.S. Department of Transportation's own procedures for selecting the safest route possible.

Mr. **Florio**. Will the gentleman suspend? This unfortunately is a very small room, and it is difficult to hear when talking is going on.

Mr. **Manes**. First, a route from Orient Point on the eastern tip of Long Island to New London, CT, would be the safest possible alternative—32 percent safer than a route through New York City. Second, 2 million fewer people in New York City alone would be exposed to the shipments if this alternative was adopted. That is more people than live in the entire State of Connecticut.

It should also be noted that the water route has been successfully used in the past. In 1976, Brookhaven made six shipments of irradiated nuclear fuel by ferry from Orient Point to New London. From there the fuel traveled by interstate highway to a reprocessing facility.

New York City's desire to transport nuclear waste across Long Island Sound to Connecticut should not be misunderstood as an attempt to pass our problems onto another community. Indeed, this is not our problem alone. Brookhaven is a Federal research facility that serves the entire Nation, not a particular State or locality.

The transportation and safe storage of nuclear waste is a national problem that requires a national solution. Unfortunately, the Federal Government has been slow to respond to the problem.

And by failing to respond, the Federal Government is putting off a problem that will only get worse. In 1985, there will be 2,100 shipments of irradiated nuclear fuel by truck and rail. By 2020, that number will have climbed 700 percent, to 15,000 annually.

The problem is especially acute in the New York City area. Many of you are aware that the Shoreham nuclear generating facility on Long Island has gone "on line" at five percent capacity.

If Shoreham becomes fully operational, it will produce large amounts of waste. In fact, roughly 65 shipments per year—more than one a week—will be necessary if Shoreham operates at full capacity. That is more waste than Brookhaven will produce in its lifetime.

We can no longer adopt a "Pay me now, pay me later" approach to nuclear waste disposal. The failure to act responsibly now could result in a great cost down the road—both in human and financial terms. The stakes are simply too high.

We are not trying to shift the responsibility to our Connecticut neighbors. We, in New York, are simply trying to reduce the risk of nuclear waste transportation based on the only scientific study to date.

The transportation of nuclear waste through New York City raises several questions, some old, some new: Haven't we learned from our past mishaps with nuclear materials? Hasn't Three Mile Island shown us in frightening detail the risks associated with nuclear technology? Shouldn't every possible precaution be taken when the lives of millions of Americans are endangered? And doesn't the prospect of weekly shipments of waste from the Shoreham plant require responsible action now?

This subcommittee knows too well that mistakes involving nuclear materials can and do happen. The possibility of a nuclear trucking accident is no longer the province of science fiction movies.

Let's reach a responsible solution to a problem that can't be wished away—a solution that minimizes, and hopefully eliminates the risk, for the greatest number of Americans.

Both the Department of Transportation and the Department of Energy have the ability to reach such a solution. Let's hope they see the light. Let's hope that they recognize that the transportation of nuclear waste is a national problem and a national responsibility. And let's hope they put safety ahead of convenience.

Thank you very much.

Mr. **Florio**. Thank you very much for a forceful statement.

## STATEMENT OF HON. GARY L. ACKERMAN

Mr. **Florio**. We would be happy to recognize any other colleagues. Mr. Ackerman.

Mr. **Ackerman**. Thank you.

I am going to be briefer than I anticipated. Let me first thank you and Mr. Lent of your committee for being so responsive to the very serious concerns of our unanimous delegation. Let me thank our borough president, county leader, for his dynamic leadership in coordinating our delegation and citizens of our city.

Let me just add, in designing a route through one of the planet's most congested areas, the Department of Energy and Department of Defense have come up with a reverse approach. They are not doing the greatest amount of good for the greatest number of people, but they have developed a plan by connecting the dots so as to expose the greatest number of people to the greatest possible danger. I can't imagine there are too many people in this country who have never witnessed an accident on the freeway or never read about an overturned truck spilling its cargo, but apparently the Department of Transportation officials don't drive and don't read newspapers.

Contentions that trucks carrying nuclear waste can't overturn and containers cannot leak sound like the assurances from the planners who claim the *Titanic* could not sink. Even if one were to presume the containers are leakproof, one cannot presume that tractor trailer trucks do not overturn.

The Department of Transportation has constructed its entire premise on a fantasy that ignores one key element. The New York City driver. It takes little heed for driving conditions in New York City and ignores national highway statistics and under real highway conditions, their fantasy can quickly become a nightmare.

Everyone within the Metropolitan New York area with a radio on in the morning hears daily of an overturned truck on the Long Island Expressway tying up major arteries all over the New York City region and delaying hundreds of thousands of people. Can you imagine the panic and the delay if it were a truck with nuclear waste? Even if it were safe, can you imagine the goings on waiting for the experts to be flown by helicopter to verify there was no leakage?

The Department of Energy doesn't know for sure their containers don't leak. The Department of Transportation does know for sure that trucks overturn on the Long Island Expressway almost every single day of the week.

I brought with me this morning a couple of pictures taken on the Long Island Expressway just to illustrate that point. These pictures are nothing spectacular. These pictures are not absolutely spectacular. You can find them daily if you can get close enough to the accident within hours.

These, I think, are milk trucks. There have been trucks with chickens, and it is pretty funny when that happens, and watermelons.

Mr. LENT. These are not nuclear——

Mr. ACKERMAN. No, these are everyday occurrences on the Long Island Expressway. This one is last week's picture on the expressway, which tied up traffic for over 6 hours. While this was going on, there were emergency vehicle accidents happening on both sides of the service road.

The Department of Transportation—let me conclude, we are under the bell, Mr. Chairman. The question of where and how to route nuclear waste has no attractive answers. Every option is flawed to some degree. But to choose a route that endangers the safety of the greatest number of citizens is absolutely senseless. It flies in the face of reason.

We hear of overturned trucks on the Long Island Expressway and other major arteries in the city every single day of the year, and we have never heard of an overturned barge.

Thank you.

[Mr. Ackerman's prepared statement follows:]

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## TESTIMONY OF CONGRESSMAN GARY ACKERMAN, (D-L-QUEENS), ON NUCLEAR WASTE SHIPMENTS THROUGH NEW YORK

Mr. Chairman and distinguished colleagues:

In Animal Farm, George Orwell describes the corruption and decay of a society's ideals that strip individuals of their personal freedoms and rob them of their well-being. In a Democracy, public policy is supposed to be shaped by the people themselves, based on what will provide the greatest good for the greatest number. The Department of Energy/Department of Transportation proposal for their nuclear-waste route is a perfect example of this principle -- in reverse. In this case, the greatest possible number of people would be put at the greatest possible risk.

The technology of the nuclear industry has raced ahead of our ability to keep up with the safety problems it leaves in its wake. We have scarcely mastered the difficulties of disposing of these highly radioactive wastes; we have done almost nothing to ensure their safe transport.

Is there even one person in this Country who has never witnessed an accident on the freeway, never read about an overturned truck spilling its cargo? I would think not. But apparently, Department of Transportation officials don't drive and don't read newspapers. They insist that trucks carrying nuclear waste "cannot overturn," and that the containers "cannot leak" -- much like the argument of a shipbuilder who claimed the Titanic could not sink.

Mr. Chairman and distinguished colleagues, the DOE's claim that the risk of incident is "infinitesimal" is absurd. It admits the possibility of a risk, however slight. It admits that as trucks roll through some of the most densely populated areas in the Country -- the City of New York and the Counties of Queens, Nassau, Westchester, and the Bronx -- a disaster of catastrophic proportions could occur that would threaten the lives of millions of Americans. It admits all of this, but refuses to prevent it.

Even if one were to presume that the containers are leak-proof, one cannot presume that tractor-trailer trucks do not overturn.

The Department of Transportation has constructed its entire premise on a fantasy that ignores a key element: the New York City driver. It also pays little heed to driving conditions in New York City, and ignores national highway statistics. And under real highway conditions, this fantasy could quickly become a nightmare.

Everyone within the Metropolitan New York Area with a radio on in the morning hears almost daily of an overturned truck on the Long Island Expressway (L.I.E.), tying up major arteries all over the New York City region, and delaying hundreds of thousands of people. Can you imagine the panic and delay if it were a truck with nuclear waste, even if it were safe? Can you imagine the goings-on while waiting for experts to be flown in by helicopter to verify no leakage? DOE doesn't know for sure that its containers don't leak. DOT does know for sure that trucks overturn on the L.I.E. every day of the week.

We hear of overturned trucks on the L.I.E. hundreds of times during the year. We never hear of an overturned barge.

The question of where to route nuclear waste has no attractive answers. Every option is flawed to some degree. But to choose a route that endangers the safety of the greatest possible number of citizens is senseless. It flies in the face of reason. The report prepared for the City of New York verifies what common sense dictates: that there would be less danger to even fewer people if the waste were ferried across the Long Island Sound to our interstate road network for its trip West.

Let's put an end to this Orwellian "doublespeak," and do what is safest, and therefore best, for the largest number of people. Let us act responsibly and transport future shipments of dangerous, radioactive material by barge. And let us eliminate the "infinitesimal" risk that, in the City of New York, could become a full-fledged tragedy.

Mr. FLORIO. Thank you very much. We would be happy to hear from any of our other members if they want to make brief comments before we go to vote.

Mr. MANTON. I think we are under pressure to vote, and I would rather defer until we return.

Mr. FLORIO. We will stand in recess for approximately 10 minutes. When we come back, we will hear from the balance of the panel. The committee stands in recess.

[Brief recess.]

Mr. SCHEUER [presiding]. The Subcommittee on Commerce, Transportation, and Tourism will reconvene the hearing on the transport of nuclear waste.

Congressman Florio has been temporarily detained in the Rules Committee, and he will be back very shortly and resume his position of leadership. In the meantime, we will finish up the New York panel. The Connecticut panel will go next. We have three or four very distinguished members from Connecticut. Then we will resume with a number of other New York members.

I now recognize Congressman Manton of New York, who has played a very, very strong and involved and committed role in working with all of the other New York City officials. Congressman Manton.

## STATEMENT OF HON. THOMAS J. MANTON

Mr. MANTON. Thank you, Mr. Acting Chairman.

At the outset, I want to express my deep appreciation to Congressman Florio, the chairman of this committee, for holding this hearing today regarding the transportation of spent nuclear fuel through the city of New York.

I also want to take this opportunity to welcome my good friend, Hon. Donald Manes, president of the Borough of Queens and to commend him for his leadership on this issue. Borough president Manes has fought long and hard to ensure the safety of the more than 2 million people who live in Queens.

Mr. Chairman, since it became apparent that Brookhaven National Laboratories on Long Island, NY, was planning to ship spent nuclear fuel through Queens in route to a storage facility in Idaho, the city of New York has fought to prevent these shipments from traveling through the most densely populated area of the country. In 1976, the city of New York amended its health code to prohibit the transportation of radioactive materials through the city. As a member of the city council, I strongly supported this measure.

However, Department of Transportation regulations make the Interstate Highway System the preferred route for transporting large quantities of radioactive materials and also preempts State and local laws that prevent such transportation. In 1984, New York City lost an 8-year legal fight to stop the shipments when the Supreme Court refused to consider the city's case.

Subsequently, the city applied to the Department of Transportation for a waiver of the Federal regulation that preempted the city's ban on transportation. Under the regulation, a waiver can be granted if DOT determines that the local requirement or regulation affords greater or equal protection to the public and does not unreasonably burden commerce. A recent study performed by a reputable risk assessment firm, Arthur D. Little & Co., concluded that an alternative route by barge around the city is much safer than trucking the waste through New York City. Regrettably, DOT has not made a determination on the waiver issue.

Over the past several months I have joined with other members of the New York City congressional delegation in urging the Department of Energy to postpone the shipments until the Department of Transportation had made a determination on the city's waiver application. We have met with both former DOE Secretary Donald Hodel and current Secretary John Herrington on this issue. However, since January 21, 1985, 16 shipments of nuclear waste from the Department of Energy's Brookhaven Laboratory have traveled through the streets of New York City.

In July, the Department of Energy halted the shipments of waste through New York City because the MH-1A casks used to carry the spent fuel rods had not been certified by the Nuclear Regulatory Commission. The fears of the city had been confirmed. For almost 6 months, nuclear waste had been traveling through New York City in a manner which many considered less than safe.

Before halting the shipments, the Department of Energy considered using a smaller cask, the GE-700, which had been approved by the Nuclear Regulatory Commission. The smaller cask would have forced the Department of Energy to greatly increase the number of shipments through the city. As a result, DOE rejected this option, not because of safety concerns associated with the increase number of shipments, but because of increased cost. The Department of Energy has asked General Electric to expand the cask and has asked the Nuclear Regulatory Commission to certify the modified cask.

The New York City case highlights the serious deficiencies in the Federal Government's policy on transporting nuclear waste. First, cost, not public safety, appears to be the primary concern of the Federal Government. Of course, the cost to the taxpayer must be a factor in determining the method and route of transporting nuclear waste. However, assuring public safety clearly must be the most important factor in this determination. Cost must never come before safety.

Second, a lack of coordination and cooperation exists between the Federal agencies that play a role in the shipping of hazardous materials. The city has applied with the Department of Transportation for a waiver of the Federal preemption. The Department of Transportation is still considering this matter. Yet the Department of Energy refused to wait for DOT's determination and began the shipments. The Department of Energy should not be permitted to continue transporting the nuclear waste through the city until the Department of Transportation has determined whether or not the city's proposed alternative route is safer.

In addition, there must be consistency regarding the safety standards developed by each Federal agency. There is a dangerous flaw in Federal policy when the agency charged with disposing of nuclear waste uses a transportation cask that has not been approved by the agency charged with regulating nuclear energy.

Third, State and local governments are not given an opportunity to play a constructive role in determining the safest shipping route. New York City has offered a safe and reasonable alternative of barging the waste around the city. Yet 16 shipments have gone directly through New York City. Why should it be presumed that the route determined by the Federal Government is safer than the alternative developed by the city? I can find no satisfactory answer to that question. Accordingly, I have cosponsored legislation introduced by Congressman Ted Weiss to create a presumption in favor of local safety oriented regulations which provide for greater or equal protection to the public than that provided by Federal regulations.

Mr. Chairman, during the next 20 years, the shipments of spent nuclear fuel across the Nation's highways will dramatically increase. Before this happens, the Federal Government must develop a sound, rational nuclear waste transportation policy that makes public safety and local concerns paramount. To date that policy has been sorely lacking. Hopefully today's hearing will get that process off the ground. I want to express my appreciation to you for holding this important and very timely hearing today and I will be happy to answer any questions the subcommittee may have.

In conclusion, Mr. Chairman, I thank this committee on this last day of a long session for holding this hearing, and we and the Queens delegation look forward to working with you in resolving this very important and crucial issue. Thank you.

Mr. SCHEUER. Thank you very much. This committee is going to have to recess for about 5 minutes.

[Brief recess.]

Mr. **Scheuer**. Congressman DioGuardi, before you testify, I want to thank you for having helped make this a bipartisan effort, cooperating up and down the line at every stage in this effort. You have the same 5 minutes the others have. Please proceed.

## STATEMENT OF HON. JOSEPH J. DioGUARDI

Mr. **DioGuardi**. Before I begin, Mr. Acting Chairman, I would like to personally thank you for the leadership role you have taken in this issue at the meetings we have had, and I hope we will come to a quick resolution of this important matter very soon.

I also want to thank the distinguished chairman, Mr. Florio, who is not here, along with the entire New York delegation. I commend him for holding this hearing today. This is an area of great contention between the States of New York and Connecticut, as you will see. It would be easier for your subcommittee to avoid this matter altogther. I am grateful to you for your willingness to see this matter receives the attention it deserves.

I believe, as do the other members of the New York congressional delegation, that the safest route to ship the nuclear waste produced at the Brookhaven National Laboratory on Long Island is to avoid the most congested metropolitan area in the country. Members from Connecticut will argue persuasively that to ship by barge in order to circumvent New York City and lower Westchester will involve greater risks. No member from either State is an expert in the transportation of hazardous waste.

But there are such experts. They work for the Department of Transportation. I am pleased to note that they are studying the problem at this very minute.

In spite of this fact, a real pressing problem exists. While the Department of Energy has suspended the shipment of nuclear waste through the metropolitan area, they will offer no assurance the waste will not be shipped again in the near future. These actions are taken for what I believe to be political reasons.

The Department of Energy asserts the shipments are safe and, therefore, do not need to be subjected to a risk analysis before they are started again. I believe the Department does not wish to open itself to the criticism leveled when shipments were resumed in the past. I believe that all people of this country deserve better service from the Federal Government. A reasonable solution to the problem exists. It should be implemented by the Department of Energy.

Having made sufficient shipments from the Brookhaven facility to free up storage space, the Department of Energy should announce an immediate halt to all shipments until the Department of Transportation makes a determination of the safest method to transport the waste. There should be no resumption of shipments until that study is made.

The study conducted by the city of New York raises serious questions about the route currently being used. These questions should be enough to warrant a halt pending further investigation. I favor shipment of this waste by barge, but I do not believe the Department of Energy or the Department of Transportation should ship this waste through Connecticut before doing an assessment of the dangers associated with that shipment.

But that is precisely what is occurring in New York City. A potentially catastrophic route for this waste has been chosen without due regard for the safety of literally millions of citizens along the highways this waste travels. As a freshman, I have not labored as long as some of my colleagues from the city on this issue. Certainly not as long as you, Mr. Scheuer. But your long fight is the reason that this hearing is being held. I commend you and them for the perseverance.

They have brought to the attention of this subcommittee an example of government by indecision. The Department of Energy has halted, then started, and now halted again these shipments. It is time to define a clear government policy in this area. It requires very little common sense to come to the conclusion that we shoud study closely the risks to human life and to the environment of the movement of this material before taking any action. This has not been done. We need to complete this study before shipping the waste.

When we are dealing with a threat to human life, cost should be a secondary consideration. Congressman Scheuer and I have called for a meeting with Secretary Dole to discuss the progress of the Department's study and the need for a swift conclusion. This meeting follows closely on the heels of a meeting with many members of the New York congressional delegation with the Secretary of Energy Herrington, that I believe influences the Department's decision to suspend the waste shipments.

Mr. Chairman, members of the subcommittee, I believe that the solution I have outlined is a reasonable one. There exists sufficient space at the Brookhaven facility to store all the waste produced there until the Department of Transportation has completed its study. The Department of Energy should not move any more waste over the roads of New York until the study is completed.

I am not convinced that the Department will, in fact, make any shipments until they have reviewed the results of this study. If that is the case, I think the people of the country should be so informed. Right now we have a decisionmaking process that is hid from the public. I think that this is wrong, and again I commend you, Mr. Chairman, for providing the forum to shed light on this matter.

Finally, as a certified public accountant, I always like to look for the bottom line in anything I do, and I think the bottom line may be summarized this way. One, we need a public pledge by the Secretary of Energy to suspend shipments until the Department of Transportation makes its decision.

Two, we must continue to press Secretary Dole of the Department of Transportation for a quick completion of their study. And, three, in the meantime, the Department of Energy must tell the people of New York and Connecticut what it plans to do and when it plans to do it. This is not a partisan issue, and that is the commonsense solution I seek to get here today.

Thank you, Mr. Chairman.

Mr. **Scheuer**. Thank you, Congrsesman Manton, for your excellent testimony.

Now, Congressman Ackerman.

Mr. Ackerman. I have already spoken.

Mr. Scheuer. You have testified.

I would like to recognize Congressman Bill Richardson of New Mexico, a member of this subcommittee.

Mr. Richardson. Thank you very much, Mr. Chairman.

I just want to ask unanimous consent to insert in full my opening statement. I am like many of my colleagues, I guess, a victim of nuclear waste. In New Mexico we are the repository for transuranic waste, and 4 years ago we tried unsuccessfully through a referendum to stop this repository in our State. So I think the focus now has shifted in New Mexico anyway toward the safety in transportation of nuclear waste, and I want my colleagues from the Northeast and from around the country to know that I join with them in praising them for bringing many issues to the attention of the public, and Congressman Scheuer and my colleagues from New York and Connecticut, I stand with you in our efforts to ensure that this nuclear waste is safe.

I urge the Department of Transportation and Energy to come up with a policy to ensure the safety of this transportation. There is a tremendous amount of public unrest, there is a tremendous amount of lack of definition of the policy, and I wish to commend my colleagues for their interest, and I stand with you in your efforts.

So, without further objection, Mr. Chairman, I would like to ask unanimous consent that my statement inserted in the record.

[The statement of Hon. Bill Richardson follows:]

### STATEMENT OF CONGRESSMAN BILL RICHARDSON

Mr. Chairman, I have a special interest in the transportation of nuclear waste. New Mexico is one of the most important states for mining and production of uranium. New Mexico is also the home of Los Alamos and Sandia National Laboratories and, most recently, has become the site of the department of energy's waste isolation pilot plant project—WIPP.

WIPP will soon become the Nation's first deep geologic nuclear waste repository. Construction is about 65 percent complete and the first radioactive waste shipments are anticipated in October of 1988. Estimated to cost about 2.5 billion dollars over thirty years of its operational life, the WIPP will ultimately isolate about six million cubic feet of transuranic wastes containing about 7.9 million curies from military sources. It will also serve as a research and development facility for about 17 million curies of high level military waste.

Since being elected to Congress, I have held over 400 town meetings throughout my district. At every town meeting I hold, the WIPP project is always a topic of discussion. There is strong public opposition to this project. We tried to stop its location in New Mexico and were unsuccessful. Once we lost this battle and became resigned to a nuclear waste repository in New Mexico, we shifted our focus to insuring safe transportation of this waste through New Mexico and neighboring states along the route. With the WIPP facility so close to operational status, my constituents and I have become increasingly concerned with the potential hazards that this repository poses to all citizens.

New Mexico's experience with the WIPP site causes me to urge DOE and DOT to do everything they can to encourage the input and cooperation of States and localities when considering nuclear waste transportation routes. Speaking from experience, I can say that citizens care very deeply about this issue and are extremely frightened of the potential consequences of nuclear waste transportation accidents. These fears are well-founded and must not be ignored. States and localities, charged with protection of local communities, fear for the safety of their residents and are concerned—with good reason—that they will be held liable in the event of a nuclear accident.

I understand the focus of this hearing today is on the transportation of nuclear waste today to commercial repositories. The environmental assessment prepared for the commercial repository program under the nuclear waste policy indicates that the number of shipments required to handle the commercial spent nuclear fuel wastes over the life of the project would be a total 173,229 shipments by truck or 22,465 by rail. An additional 6,720 truck shipments would be required for defense high level wastes. It is my fear that WIPP, with its limited mission of disposal of military wastes, will fall through the cracks in any discussion of nuclear waste transportation.

Citizens along military waste transportation routes deserve the same protections as citizens on commercial waste transportation routes. It is my firm belief that liability coverage for nuclear waste accidents should be expanded to include all shipments of nuclear waste to Federal storage and disposal facilities. Under current law, a transportation related nuclear incident that involves government employees rather than those of a contractor would not be covered by the liability provisions of Price-Anderson. A change in this law to include Government employees would not only benefit New Mexico but all States that provide the transportation routes for repository bound nuclear wastes. I also believe Congress should specifically include Federal high level nuclear waste repository and storage facilities in Price-Anderson coverage. As the ultimate destination or temporary storage facility for the commercial spent nuclear fuel and other radioactive wastes specified in the nuclear waste policy act, these Federal installations represent major sources of potential health and safety risks to the host States as well as to those living along the transportation corridors. The highest degree of assurance for their protection should be mandatory coverage under the law.

Once again, Mr. Chairman, I thank you for holding this hearing today and will reiterate my concern that DOT and DOE do everything in their power to solicit the input of citizens, localities and States when making determinations on the transportation routes of nuclear waste.

Mr. LENT. Would the gentleman yield?

Mr. RICHARDSON. Yes.

Mr. LENT. Did the gentleman say in his State there had been a public referendum on whether or not New Mexico could continue to be a repository for waste, nuclear waste?

Mr. RICHARDSON. It was a legislative referendum. What New Mexico tried to do was when the waste first came to New Mexico, the Department of Energy stated to New Mexicans that New Mexicans would have the right to veto the proposal. And subsequently the Department of Energy's Secretary changed and that veto assurance was withdrawn, and an effort was made to bring this issue as a referendum before the public.

A vote took place in the legislature to generate this referendum, and time went by and the referendum was held in the New Mexico Legislature.

Mr. LENT. Thank you.

Mr. SCHEUER. That illustrates my point of the need for more collegiality between the Federal, State, and local levels. There has got to be local input and the Federal Government shouldn't fight it, they should encourage it. I appreciate your comments very much.

I would like to recognize Congressman Lent of New York, who has been a consistent supporter of our effort, who along with Congressman DioGuardi, has supported our efforts and has helped to make this a totally bipartisan issue.

Mr. LENT. Thank you, Mr. Chairman.

I am happy to have this opportunity to welcome our guests this morning, not only our colleagues, but our Queens Borough President Donald Manes. I know this is an issue of special concern in all of your congressional districts, and I am glad Chairman Florio, who incidentally I just left, he and I have been testifying the last hour before the Rules Committee on a series of bills we are trying to get out of the Rules Committee, and he is still over there and will join us as soon as he can.

I am pleased that Chairman Florio convened this hearing so we can properly examine an issue that will be coming increasingly important with the passage of time, the transportation of nuclear waste through heavily populated areas. My interest, as you know, is more than just the interest I have as a member of this subcommittee. I represent a part of Nassau County through which the spent fuel from the Brookhaven National Laboratory moves on its way westward. I also represent a district that will receive power from the Long Island Lighting Co.'s nuclear plant at Shoreham when that facility opens, hopefully in the near future.

There is enough, I am told, spent fuel storage capacity at the Shoreham plant to last 10 years. But when we reach that point in time, LILCO is either going to have to truck or barge, depending on whether you come from New York or Connecticut, the excess spent fuel to one of the permanent disposal sites provided by the Federal Government. So as Mr. Manes said earlier, this is a national issue which demands a national solution. The issue is simply broader than what to do with Brookhaven shipments.

In the case of New York, it concerns future shipments from the Shoreham plant and on a national scale, it concerns shipments from any plant across the country to permanent disposal sites when those shipments necessitate passage through heavily populated areas. When I say "heavily populated areas," I include Rosedale and Douglaston as well as Bridgeport, Hartford, and Waterbury, CT.

So I am hopeful, Mr. Chairman, that we can conduct this inquiry with an eye toward finding solutions that balance genuine concerns about the safety of the population and the adequte need for the transportation of radioactive materials, places of permanent storage.

Thank you, Mr. Chairman.

Mr. SCHEUER. Thank you very, very much. This then completes the work of this panel. I thank all of you. I especially thank the two very distinguished public officials who came down from New York, Julia Harrison, and of course Borough President Donald Manes, who has been a leader in this bipartisan effort from its inception many, many years ago. Thank you all very much.

## STATEMENTS OF HON. SAM GEJDENSON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CONNECTICUT; HON. BRUCE A. MORRISON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CONNECTICUT; AND HON. JOHN G. ROWLAND, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CONNECTICUT

Mr. SCHEUER. We will now hear from the Connecticut panel of very distinguished friends and colleagues: Congressman Sam Gejdenson, Congressman Bruce Morrison, Congressman John Rowland—going off the record.

[Discussion off the record.]

Mr. SCHEUER. Going back on the record.

One of our aircraft is missing, Congressman John Rowland.

Mr. GEJDENSON. I would like to point out the bipartisan panel sitting before you.

Mr. SCHEUER. Is Barbara Kennelly in the room?

Mr. GEJDENSON. She will be submitting a statement for the record at a later date, as I believe other colleagues from Connecticut will.

Mr. SCHEUER. She was here registering her concern for her constituents. We welcome that and congratulate her for that.

Mr. GEJDENSON. Despite the appearances of what might be a predetermined chairman, I am sure that the tremendous merit of our case will overcome what may be the parochial interest of some members on this panel. I know the fairness of the sitting chairman is of such great magnitude, we may have an even shot at getting him over to our side.

Mr. SCHEUER. Going off the record again.

[Discussion off the record.]

Mr. GEJDENSON. Let me say this is a problem, as Mr. Lent properly pointed out, that goes beyond the Brookhaven problem. What we face here is a situation where the city of New York is trying to take its problems and shift them off on its neighbors. While the primary focus is a small number of shipments from Brookhaven, whether it is future nuclear plants or other hazardous problems from New York State, the citizens of Connecticut or New Jersey cannot be expected to take that burden.

While I recognize the need for safety, when we examine the alternatives under the present system, it is clear an alternative route through Connecticut is not safer, but in many ways more hazardous. The Department does not have a standard for moving nuclear waste on the water. It would mean moving the shipment first by land, then by water, and again by land and on a significant amount of local roads before actually accessing highways.

The route through Connecticut is 50 percent longer to the point of convergence with the route that went directly through New York City. The risk of transportation over Long Island Sound can be a significant one. Both Hartford and New York City do not have beltways, and citizens of Connecticut deserve the same kind of concern for their safety as the citizens of New York have for their own. Connecticut is the fourth most densely populated State, and the additional cost of $1 million in transportation through Connecticut will not only provide additional cost for taxpayers, but give them additional danger.

New York City's and New York State's benefits of the hundreds of millions of dollars from the existence of this facility in their State cannot be overlooked. Citizens of New York State and New York City get the benefits. They have to be ready to take some of the risks. Or will we next see that every garbage, every hazardous waste generated in New York City will be shipped elsewhere?

If it is such a hazard, if the population density is such an overwhelming argument as the people of New York City and its representatives try to make, maybe New York City and New York State, or at least on the Island, should indicate they are unwilling to take any new industry, they are unwilling to keep any of those industries that generate hazards.

The form of government we have established and is developed with its 50 States provides for certain parochial interest, and some of that we see here today both from the elected leaders of Connecticut and New York. But it seems clear that the benefits and the costs, the net pluses and minuses of industries and hazards must be shared by those individuals that reap the most benefit. You can't simply say "I want all the pluses, but I am going to give the minuses to my poor neighbors to the south or to the north."

The New York delegation has proposed a number of alternatives. Some of them need to be examined. There are failings in many of them, but certainly the present system needs to be examined further. But the only criterion our colleagues from New York seem to emphasize is simple density of population. There are other factors, the length of the route, the complexity of transporting and translocating, and again I come back to the benefits. You can't have it both ways. You can't ask for the jobs, you can't ask for the electrical power, you can't ask for the economic benefits of industry and then say that somebody else, someone far away must take all the dangers.

Frankly, this Congress, and States have recognized this in low-level waste and presently the compacts around the Nation, are trying to develop a method for dealing with the waste generated in some of the fine medical facilities in New York City, and States either regionally or individually are taking that responsibility. We are understanding no State wishes to be the recipient of all the danger and all the garbage.

And while Mr. Florio is not here, I am convinced that his staff will make sure that he is aware of an alternative route that we have proposed. My staff will please hold up the map. Not to weigh heavily on the parochial interest, but the chairman might notice, if he is here, the red is his congressional district. If one would put the picture of the map of the United States in their mind, Idaho is way the heck over there somewhere else, and you can take a number of routes to get there efficiently.

I might say that we have taken this one where you would barge it over to somewhere in northern New Jersey and follow the turnpike down and across and it just does happen to go through Chairman Florio's district. There is also a Route 30 that comes from the shore and would also by accident go through Represenative Florio's district. I might point out that his district is far less densely populated than New York City, and that maybe we ought not simply be looking to ship these problems over to Connecticut but New Jersey farther to the South, or many Southern States have the same lesser density of population.

Mr. **Scheuer**. As a matter of curiosity, why did the gentleman just cut across that narrow net of Congressman Florio's——

Mr. **Gejdenson**. It was impossible to weave through the entire district.

Mr. **Scheuer**. You could have started at the south, gone to the north and then turn left.

Mr. **Lent**. Would the gentleman yield?

Mr. **Gejdenson** I would be happy to yield.

Mr. **Lent**. How does the waste get to the point of beginning?

Mr. **Gejdenson**. A barge. It would be barged from Brookhaven.

Mr. **Lent**. Through the Long Island Sound?

Mr. **Gejdenson**. You truck it across Long Island. You can't put it right on the barge.

Mr. **Lent**. Just in the nick of time. We thought we had a legislative solution here.

Mr. **Gejdenson**. It seems, Mr. Chairman, the appropriateness of your return is well beyond what you might have imagined. Although I will leave a written version of my testimony for your edification, and I am sure you will have no objection to putting it in the record in full, it is appropriate you have returned at this point.

My basic premise is those States or municipalities that reap the benefits have to be willing to take the burden. We don't want to shift all the benefits to one locality and shift the garbage to others. If New York City feels it is such a predominant issue, maybe they need to establish a plan that would move Brookhaven and other facilities off to other parts of the country, even hospitals and things that generate low-level waste may have to be moved out of the major metropolitan area as radioactive materials from hospitals are moved.

But what this particular map demonstrates, Mr. Chairman, is that there is a route which goes through a lower population density area than New York City, and that goes other than in a northern direction. And you might recognize the reddened area as something slightly familiar to you. It is not just that one point where the barge would come in. Actually any of the communities, much like New London, which is basically a resort community, where people come to swim in the summer, any of those communities along the New Jersey shore could be a point the barge would go and ship the waste from New Jersey and off to Idaho.

Although that is somewhat humorous and intended to be so, it is deadly serious. To our citizens, it is clear that what New York State wants is to get the LILCO power benefits, to get the economic resources of the Federal Government from Brookhaven, but the garbage is to go to the citizens of Connecticut, and that is unacceptable.

I yield to my next senior colleague, Bruce Morrison, from New Haven.

[The prepared statement of Mr. Gejdenson follows:]

# TESTIMONY OF CONGRESSMAN SAM GEJDENSON OF CONNECTICUT
BROOKHAVEN NUCLEAR WASTE TRANSPORT HEARING
HOUSE SUBCOMMITTEE ON COMMERCE, TRANSPORTATION, AND TOURISM
AUGUST 1, 1985

Mr. Chairman I am glad to be here today to testify in regard to the proposed transport of radioactive waste from the Brookhaven National Laboratory on Long Island through Connecticut. I am also pleased to discuss the larger ramifications of this matter as it relates to the entire issue of nuclear waste transport. I share New York's concern that this waste be transported in the safest manner possible. However, shipping the waste through Connecticut is not the answer to the problem.

New York's proposal to ship waste through Connecticut is nothing more than an attempt to transfer its nuclear waste problem to someone else. The proposed routes through Connecticut are not safer than transporting the waste through New York City; in fact,they are more dangerous. The Connecticut routes are longer, and the route is more expensive to the federal government.

If granted, New York City's request that it be able to ban the shipment of spent nuclear fuel on its highways would set a dangerous precedent that could interfere with the safe and equitable transport of these wastes for years to come. Uniform regulation is essential to the transport of nuclear wastes. Without uniformity a chaotic and unworkable situation would result in which it would be virtually impossible to transport nuclear waste anywhere.

Pursuant to Section 112(b) of the Hazardous Materials Transportation Act (HMTA), New York bears the burden of proof in its application for a non-preemption determination. New York must prove that its proposal does not unreasonably burden commerce, and that it provides an equal or greater level of protection to the public than is afforded by federal regulations. New York's application does not meet these requirements.

The alternate routes proposed by New York City will result in a substantial increase in the mileage over which the waste is carried. The proposed New London route, for example, would necessitate transport over Long Island Sound and would run 210.1 miles to the point of convergence with the New York City route. The route through New York City, on the other hand, would be direct, on dry land, and would only run 139.2 miles to the same convergence point (the junction of I-84 and I-87 in New York State).

Adoption of a lengthier route will result in increased costs, which the federal government will have to bear, due to the fact that the Long Island based Brookhaven National Laboratory is a federal facility operating under contract to the Department of Energy. Should an alternate route through New London be chosen, the extra cost would amount to roughly $1 million over the next fifteen years. It should be emphasized that the above costs would come directly out of B.N.L.'s federal budget.

At the same time, New York's economy directly benefits from this Federal facility. Last year, B.N.L. received almost $200 million in federal funds. In FY 1984, it received $172.8 million, and in FY 1983 federal support totalled $176.9 million. New York reaps the benefits, and it must also accept the burdens of that facility. .

New York's study also failed to take into account the increased occupational exposure to bystanders due to the increased mileage of the alternate routes. Department of Transportation guidelines define the radiation dose from normal highway transport of radioactive materials as being the sum of four different exposure groups. This assessment sum is comprised of the combined exposure to people residing along the route, to passengers in other vehicles, to the truck crew, and to people at truck stops. New York ignores the increased risk to the drivers and innocent bystanders that will result from the alternative routes due to their increased mileage. The state of Connecticut's analyst, Energy Research Group, after taking into account many factors, states that the route passing through New London is in fact 40% more risky to the general public than the New York City route. This calculation is derived from considering increased exposure, both normal and incidental, as well as economic and public health risks.

Furthermore, New York ignores the substantial risks of transporting the B.N.L. waste over Long Island Sound. To assign a zero risk factor to this procedure is inexplicable, as it ignores seasonal risks, ignores transportation precautions which will have to be taken, and thus obfuscates the real potential of disrupting commerce by an inefficient means of transportion. Moving nuclear waste over Long Island Sound is an extremely complicated matter, much more so than an on land route. The Captain of the Port must devise regulations for the transport of the waste each time it is moved across the water. The United States Coast Guard must be brought in to oversee the operation. Moreover, the shipments would be subject to further restrictions, including the Ports and Waterways Safety Act and Coast Guard regulations. Numerous steps and precautions would be a normal part of the process, thus vastly increasing the chances of delay and disruption to commerce. New York consistently overlooks these logistical problems in its oversimplified assessment of Long Island Sound transit. The route through New York City is far simpler, less costly, and poses less risk, in terms of health and safety and in terms of maintaining unimpeded commerce.

In addition to ignoring the complicated nature of over-water transport, New York further overlooks the fact that once the shipment reached Connecticut, it would have to traverse local roads before reaching the interstates. The differences in seasonal traffic along Connecticut's coastal routes could very well impede the process and place more people at risk. Moreover, whereas the federally preferred route is designed to skirt and avoid the center of New York City, the alternate proposal would bring the waste directly through downtown Hartford. These factors increase the risks of accident and increase the chances of exposure to the public.

New York fails to adequately consider the hazards of the proposed Connecticut routes by ignoring the risks involved in crossing an urban waterway and traversing local roads. In addition, the proposed Connecticut routes merely substitute transporting the wastes through several urban centers (possibly including Hartford, New London, Waterbury, and Bridgeport) in order to avoid a single urban center (New York City).

New York claims that its ban on transporting nuclear waste through the city is necessary because it is the only major urban area without a highway, or beltway, enabling such transport to avoid the city proper. This is simply not true. Two of the proposed alternate routes would bring the waste through Hartford. This major city has no beltway. New York's second rationale for imposing their ban is that New York is the most densely populated urban center in the nation. While this is true, it is also important to underscore that Connecticut is not a rural state. According to the World Almanac and Book of Facts (1985), Connecticut ranks as the fourth most densely populated state in the country.

Finally, New York's application raises the serious implication of setting a precedent of adjusting the uniform regulations which govern transportation of these wastes, simply to accommodate the debatable needs of an individual locality. The need for such uniformity is unquestionable, as D.O.T. itself stated in a 1984 ruling on nine different actions (from three states) which they deemed to be inconsistent with the Hazardous Materials Transportation Act. The department stated:

"The nature, necessity and number of hazardous materials shipments make uniform standards extremely important."
(Federal Register, 11/27/84: 46633)

Speaking further about the regulations which were deemed to be inconsistent with federal law, the D.O.T. continued:

"The aggregate effect of all these regulations has been to significantly affect the ability of carriers... to transport radioactive materials in accordance with the nationally uniform system of highway routing which the department sought to achieve by promulgation of regulations under HM-164."
(Federal Register, 11/27/84: 46635)

New York's regulation under its Public Health Code must be seen in the same light as those commented on above. Adhering to such requests would serve only to fragment and undermine the national uniformity of transportation regulations for hazardous waste. Indeed, D.O.T. said so itself, stating:

"...the proliferation of indepently enacted restrictions would lead to the type of regulatory balkanization which Congress sought to preclude by enacting the H.M.T.A.."

These ramifications must be considered, as they were earlier, before the department acts on New York's application.

Members of the New York delegation have proposed legislation to attempt to achieve legislatively what they have not been able to achieve thus far through the courts and the bureacracy, an end to the shipment of nuclear waste through New York City. I regret to say that on balance the bills submitted by my distinguished colleagues from New York are more of a barrier to the safe and equitable transport of nuclear waste than a solution.

H.R. 1146 would shift the burden of proof from states and localities to the federal government in preemption decisions. This proposal would create an unworkable chaos in which the transport of nuclear waste would become impossible. By sanctioning the creation of a patchwork of conflicting state, local, and federal laws H.R. 1146 would further aggravate the nuclear waste transport problem.

H.R. 1105 would forbid truck shipments of radioactive materials from entering any city with a population of over 50,000. This bill is obviously unworkable. If implemented it would cause total transport mileage to increase dramatically and also force the waste to be shipped on substandard highways.

H.R. 2938 would require DOT to file an environmental impact statement in cases where waste is shipped through a metropolitan area. This proposal, while not without merit, is not a solution to the immediate problem of the transport of waste from the Brookhaven Laboratory. Environmental impact statements take years to prepare and would not resolve the current conflict between Connecticut and New York City.

When all the facts are considered, it is clear that rerouting the transport of radioactive waste through Connecticut will not result in reduced risks. New York's proposal might, in fact, result in higher risk levels, due to the transport of the material over more miles, on local roads, and over water.

If granted, New York City's request that it be able to ban the shipment of spent nuclear fuel on its highways would set a dangerous precedent that could interfere with the safe and equitable transport of these wastes for years to come. Large, well-financed entities such as New York City would be able to exploit the regulatory system to the detriment of the interests of the citizens of smaller cities of America.

## STATEMENT OF HON. BRUCE A. MORRISON

Mr. Morrison. Thank you, Mr. Chairman, for the opportunity to testify today. I won't try to compete with my senior colleague in his audiovisual presentation. I would ask my written statement be submitted.

Mr. Florio. All the statements will be put into the record.

Mr. Morrison. I want to underscore several points that expand on what Mr. Gejdenson has said. First of all, safety of citizens is something on which we all agree. There is no debate here, that in the transporting of hazardous waste and hazardous material at all points, the first place that we start is with respect to safety. There is no lack of agreement on that, and I think we should start with that common ground.

Beyond that, we have the common ground that no one likes the thought of being exposed to hazardous materials at any place or any time. Yet they are a reality of modern life. It can very easily degenerate, a discussion of hazardous materials, into "We don't want it, you take it." That is a convenient debate but leads nowhere in terms of a solution. The solution arises from principles of fairness and maximizing of safety. Everyone would like to avoid the problem, everyone is going to have to be a part of solving it.

Now, I think that the Federal legislation that we have in terms of the Hazardous Materials Transportation Act is based on the right principle, that ultimately the Federal Government needs to play the role of the preemptor of local decisions in order to see to it that parochial concerns don't govern. I think it would be a mistake if the law is changed to give a veto power to any locality. Considerations of what localities can add to the process in a decisionmaking way is one thing. The lack of preemption of veto power, which I find that the New York Legislature has sought essentially, that is really not tolerable.

No one locality can be given that kind of power. It is certainly wrong, and I think my colleague, Congressman Gejdenson, has underscored it very effectively. New York City and New York State have certainly been willing to expose their citizens to the generation of these wastes, they have been willing to create the Shoreham plant, Indian Point, et cetera, where these wastes are generated. Their generation leads to the exposure to the population as well.

It is really a lot—there is a lot of question as to which is the more dangerous, in fact, the actual generation of the waste, the source of the generation or the transportation of it in small quantities. It is a bit ironic that there is this move toward an absolute ban or an attempt to an absolute ban on the transportation of these wastes when, in fact, many installations in New York State are generating them.

We need, I think, most of all in this particular controversy not to allow the suggestion that there are no problems in transporting this through Connecticut, that we could somehow say New York is the most densely populated city in the area and transportation through Connecticut won't create a problem. I think that many citizens will be exposed to these wastes being transported. There is much to be said for the increased mileage through Connecticut, increased risk, to be said for the fact that water transportation hasn't even been studied as to what risks are involved, that having to load and unload barges provides another opportunity for problems, that if you use the barge transportation system, you go off of major highways onto local streets, small streets where accidents are more likely to occur.

The suggestion population density is the critical element really is not a fact. The question is, what is the risk of an accident? What kind of activities will give risk of an accident? There are parts of the transportation through New York where an accident would expose few people, there are parts where an accident would expose many. Simply in Connecticut there are parts there would be small exposure, there would be parts there would be great exposure.

My mother lives on the North Shore of Long Island, and so I am not unconcerned about the exposure of people throughout the entire area. But I am concerned with an attitude that would suggest that another political jurisdiction is the place to impose the risk. Realy, the gentleman from New York who was chairing the hearing at the start said this is bipartisan, it is not political. There are different kinds of politics and the politics of one jurisdiction against another is another kind of politics. I don't think we should degenerate into that.

Let me finally say with respect to the overall, I would hope this committee would not intervene in a way seeking to give special standing to the local New York rules and New York decisions which really have been rejected by the courts as beyond what they can reasonably expect to impose on other jurisdictions and that the committee would look at anything that it does to the resolution of these intrajurisdictional disputes rather than fostering of them.

I think in any change in the legislation we see, we ought to see some method by which these concerns are mediated and perhaps arbitrated when two areas are in competition. Certainly in the end, any two jurisdictions are going to fight over this and most importantly, everyone is going to try to shift their burden to someone else. As Congrssman Gejdenson has dramatically demonstrated, that can fall in many places, and I don't think any of us will necessarily be happy with all such results.

Let us remember it is a national problem, that the benefits and burdens ought to be shared in an equitable way and that safety ought to be thought of not as a political question but as an objective one, which I think it can be.

Thank you very much.

[The prepared statement of Mr. Morrison follows:]

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Member of Congress
Third District, Connecticut

## TESTIMONY BY THE HONORABLE BRUCE A. MORRISON

THIRD DISTRICT CONNECTICUT

SUBCOMMITTEE ON CONNMMERCE, TRANSPORTAION AND TOURISM

COMMITTEE ON ENERGY AND COMMERCE

AUGUST 1, 1985

Mr. Chairman and members of the Committee, I appreciate the opportunity to testify before you today on a matter of grave concern to me and to the State of Connecticut. The transportation of hazardous materials and waste is an issue which evokes strong reactions from the people who are potentially effected by the routing decisions made and from the elected officials who represent them. The potential for danger, to both the residents and the environment, from an accident demands that decisions be made in a way which minimizes risk and prohibits the imposition of the will of one locality on another.

The Congress recognized these considerations when it passed the Hazardous Materials Transportation Act (HMTA). This legislation authorizes the Secretary of Transportation to designate certain materials as hazardous, and to issue and enforce safety regulations governing the transportation and handling of such materials. The HMTA preempts any State or local law which is inconsistent with the mandate of this legislation, and allows a waiver of the preemption only when the alternative proposed by the state or locality is demonstrated to offer an equal or greater level of safety and does not unreasonably burden commerce.

Mr. Chairman, the current proposal by the City of New York to ban the transportation of nuclear waste from Brookhaven National Laboratory from its boundaries, and to ship it across Long Island Sound and through Connecticut, meets neither of these conditions for the issuance of a non-preemption determination.

In terms of safety, there are a number of factors which lead me to the conclusion that that the potential for an accident would be increased if Brookhaven's waste were shipped through Connecticut. First, the proposed routes through Connecticut are longer than a direct route through New York City, thus increasing the possibility of an accident. In fact, one Connecticut route is 70 miles longer than the New York City route.

Second, the proposed Connecticut routes involve a greater use of non-interstate highways than the direct route through New York City. It should be noted that the regulation promulgated in conjuction with the HMTA, HM 164, recognizes in its routing requirement that shipment over local roads is undesireable, and defines a preferred route as an interstate highway for which an alternate route is not designated by a State routing agency.

Third, the proposed Connecticut routes would necessitate the transportation of the nuclear waste, by barge, across Long Island Sound. While this is an untested mode of transportation for the shipment of spent nuclear fuels, there are a number of considerations which should be taken into account. Most importantly, barge transportation would necessitate additional unloading and loading of the hazardous cargo, thus increasing the possibility for a mishap. And, no regulations have been promulgated by the Department of Transportation for the this mode of transportation.

Fourth, New York City argues that the shipment of nuclear fuels through its boundries would be less than safe because no interstate beltway is available around the city. This argument is predicated on the fact that the preferred routing reuirements contained in HM 164 specifically state that, when available, an interstate beltway around a city should be used. However, it must be noted that Hartford Connecticut, a major urban center through which the waste would travel under two of the proposed alternatives, has no beltway.

Fifth, while it is understandable that the City of New York, with its massive population, would be concerned about the potential safety threats posed by transporting spent nuclear fuel through its boundaries, it must be stressed that Connecticut is the fourth most densely populated state in the nation. And, the alternative routes proposed by New York City would force the nuclear waste from Brookhaven National Laboratory to be transported through some of Connecticut's major urban centers, possibly, including Hartford, New London, Waterbury, and Bridgeport.

Finally, New York City bases its request for a non-preemption order on a report prepared by the Arthur D. Little Company. It is important to note that this report does not take a firm position in favor of New York's application. At one point it states "it should be emphasized that no conclusion is drawn herein as to whether the results support a non-preemption application." Further, analysis of this report has revealed that it failed to take into consideration a number of important points in calculating the risk of shipping the waste through Connecticut. Among the risk factors not calculated are the additional risk posed by transporting the waste across Long Island Sound; varying traffic levels during different times of the day on Connecticut roads; and the seasonal variation in the population of a number of shoreline communities in both New York and Connecticut. A reanalysis of risk, undertaken under the auspices of the State of Connecticut, states that the proposed New London route is 40% more risky than the New York City route.

Mr. Chairman, I also believe that commerce would be unreasonably burdened if New York City's request for a non-preemption order was granted. Again, a number of factors lead me to this conclusion.

First, the cost of shipping the nuclear waste from Brookhaven National Laboratory in the manner proposed in the application for a non-preemption order would be higher than its direct shipment through New York City. This is due to both the increased length of the Connecticut route and the additional costs incurred through barging the waste across Long Island Sound.

Second, if the proposed alternate route is approved, a precedent would be set which could adversely affect commerce in the State of Connecticut for many years to come. Not only would the high level nuclear waste from Brookhaven travel through Connecticut, but waste generated from other facilities on Long Island would also be routed through the state. This is not an academic argument, for it must be remembered that the Shoreham nuclear genearator in Suffolk County, N.Y., is currently being tested, and there is a possibility that it may go on line in the not too distant future.

Finally, it must be remembered that it is the State of New York which benefits from the presence of both the Brookhaven facility and any other facility which generates nuclear waste on Long Island. Such facilities create employment opportunities, generate taxes, stimulate housing development, etc. In 1984 alone, Brookhaven received almost $200 million in federal funds. Undoubtedly, some of these benefits of this federal investment spill over into nearby New York City. Yet, if New York City's plan is approved, Connecticut would be asked to assume the most severe risks associated with these facilities. Clearly, this is not only unfair, but it asks the state of Connecticut to assume a risks from facilities from which it derives no benefits.

Mr. Chariman, three pieces of legislation have been introduced which would effectively stop, at least in the near future, the shipment of nuclear waste through New York City. Each of these has been introduced by a member of the New York delegation. It is apparent that they are attempting to accomplish through legislation what could not be accomplished in any other way. A brief review of the history of this issue amply demonstrates this fact.

In 1976 New York City amended its health code in such a way as to effectively prohibit the transportation of most commercial shipments of radioactive materials in or through it. The amendment amounted to a ban on the use of motor vehicles for transporting spent nuclear fuel from reactors on Long Island. Brookhaven National Laboratory responded to the City's action by petitioning the Department of Transportation (DOT) for an administrative ruling declaring the amendment to be inconsistent with, and thus preempted by, the Hazardous Material Transportation Act (HMTA).

In April, 1978 DOT found that the amendment to New York City's Health Code was not preempted by the HMTA. The basis of this finding was that, although the HMTA authorized the Secretary of Transportation to develop national standards for the routing of radioactive materials, the Secretary had not yet initiated any exercise of that authority. Consequently, in DOT's view, municipalities like New York City were free to enact their own routing rules until such time as DOT took action on the matter.

In 1981, DOT adopted HM-164 -- regulations governing the transportation of hazardous nuclear waste. After publication of the rule, DOT preempted New York City's statute. New York City sued, contesting the constitutionality of HM-164, and while they won in the lower court, they lost at the appeals level. The Supreme Court refused to hear the case. New York has now asked for DOT to issue a non-preemption determination.

Mr. Chairman, in adopting HM-164 the Department of Transportation specifically noted that local jurisdictions are inherently limited in perspective with respect to establishing routing requirements for hazardous waste. DOT rightfully believed that because they are accountable only to their own citizens, local governments may not take sufficient account of the adverse impacts of their routing decisions on surrounding jurisdictions. They therefore required that a state agency designate alternate routes.

Unfortunately, they did not anticipate the possibility that a local jurisdiction's decision could adversely affect another state, and therefore made no attempt to deal with this possibility. Clearly, this is a shortcoming in the regulation that needs to be addressed. Until it is addressed, conflicts such as the one between New York City and Connecticut will continue to arise.

It is clear to me that in the current situation New York City did not consider the affects of its request on the residents of Connecticut. These people, including my constituents, have a right to have their interests represented. I am grateful for the opportunity to do so in this forum.

Mr. FLORIO. The last gentleman from Connecticut.

Mr. GEJDENSON. While Mr. Rowland is the most junior in years, he is the youngest Member of Congress, he has great wisdom on this issue.

## STATEMENT OF HON. JOHN G. ROWLAND

Mr. ROWLAND. Thank you.

I venture to say this is probably the first issue we have agreed on over this past 8 months—maybe the second issue we have agreed on. I would like to thank you for having this very important hearing and for taking the time to solicit our views and the views of New York.

Without going into great detail on the legislative history of the law, the Hazardous Materials Transportation Act of 1975, what is clear to me is that Congress was attempting to bring some kind of uniformity, some kind of sanity to this very difficult issue when they passed the act about a decade ago. Quite simply, we had been operating under a structure in which localities and States, for whatever reasons, legitimate or not, were seeing their way clear to enact prohibitions and bans on the transport of low-level radioactive waste and other materials through their particular boundaries. Clearly this threatened to undermine our Nation's ability to effectively and efficiently move this material to its final storage site.

Very few individuals would argue against the fundamental principles of HMTA, which would establish national standards for the use of the most direct surface routes in moving hazardous waste and limiting the ability of localities to block the transport of this material through their own boundaries. It is clear Congress intended to provide some degree of protection to localities through the nonpreemptive determination mechanism.

That allows localities to make a case that transportation of such materials through their boundaries is not the best alternatives. But it is also clear to me the primary purpose and the goal of HMTA was to establish uniform standards for transporting these wastes and other materials. This is borne out in the current controversy between New York City and the State of Connecticut over who should have the responsibility for routing spent nuclear fuel from Brookhaven National Laboratory. New York doesn't want this radioactive waste going through their metropolitan area because they claim it will travel over a crowded interstate highway. They proposed instead to barge it across the Long Island Sound to Connecticut and then send it on its way on a circuitous route through our State to Idaho.

There is one major problem with the New York proposal, and that is their own paid consultant doesn't really support it. The firm of Arthur Little in a report submitted by the city to the Materials Transportation Bureau specifically did not recommend that Connecticut routes be used nor did they suggest one way or another that the client's application for nonpreempted determination were legitimate. If New York's case were so compelling, I would think their own paid consultants would have said so.

Initially the report claims to have calculated the Connecticut route would be marginally safer. But in my opinion, their contention has more holes than a piece of swiss cheese. First the Little report did not address questions of safety of the barging process, including the chance a spill would occur in the Long Island Sound. If we don't want to transport this stuff on our highways, I don't think we want it sitting on the floor of the Long Island Sound, let alone the fact our ports don't meet standards to receive this material. They didn't factor in the longer routes or the conditions of our roads and our bridges, which in certain instances leave something to be desired.

The Little report did conclude shipping this material through the circuitous Connecticut routes would be anywhere between 20 percent and 220 percent more costly than the direct New York routes.

In summation, New York's case for a nonpreempted determination fails the key test since it would not be safer to make the shipments of hazardous nuclear waste through our State. The greatest danger in the situation, however, is the danger to the national interest if New York wins this case. There would be a floodgate of similar actions by towns and cities across this Nation seeking to duplicate New York's call for preferential treatment. An enormous precedent would be set.

I can tell you bluntly that if New York wins, I would consider suggesting to Waterbury and Danbury and other cities and towns through all our districts that we file a similar application. After all, the alternative route would involve Interstate 84, which runs directly through large cities, and there is no alternative beltway. The case they could put forth would have the same validity as New York.

I hope, however, it doesn't come to that. Nor should it ever come to that if legislative history of the act demanding uniformity is followed. As I mentioned at the outset, I see a collision course between the overriding purpose of the national standards of HMTA and the nonpreempted determination process. If the latter becomes the rule rather than the exception, and this will happen if New York wins, then I would say the HMTA is effectively gutted. Quite frankly, the same result would occur if amendments are made to HMTA along the lines which have been proposed by Mr. Biaggi and Mr. Weiss. Mr. Biaggi proposes to prohibit the transport of any radioactive waste through large cities, which are defined in his bill as having a population of 50,000 or more. I cannot imagine how it will be possible to ship any material through any interstate system under this proposal.

Mr. Weiss proposes to shift the burden of proof on nonpreempted determination from the applicant to the Federal Government. Thus, we would have a situation where a Federal agency designs uniform national standards on one hand only to be forced on the other hand to give priority to individual situations.

Mr. Green proposes that environmental impact statements be required whenever the shipment of radioactive materials through urban areas is considered. This justification of this bill and safety considerations, I believe, would add another layer of red tape to a process which is already becoming never-ending in its nature.

Again, Mr. Chairman, I appreciate the opportunity to give you my viewpoint of this important issue. I have touched on the New York-Connecticut controversy because I believe the potential of the nonpreempted determination process is harming the uniformity standards of HMTA. I suggest we take a good look at restricting the ability of local governments to invoke this clause as they attempt to avoid the national uniform standards which the law seeks to provide.

I want to thank you again for allowing us to testify. Later on you all will hear from our attorney general who also has some comments. We welcome any questions you may have.

Mr. FLORIO. Let me thank all three of the members for their testimony. I think Mr. Rowland's testimony, though, points out the deficiencies of looking at this in the strictly narrowest provincial competing site approach that seems to be evolving here today. As you have indicated, if New York State in this context prevails, or if the initial decision had been to route through Connecticut, you would be here arguing against absolute preemption, arguing on the other side of the issue, and the people in New York would be here arguing your position.

So I think though this is in the context of a specific dispute between two locations, I think it is the committee's responsibility to look at the generic law. The committee should make appropriate modifications, if necessary, to deal in a sensible way with the interaction between Federal regulation, regulatory authorities and non-Federal regulatory authorities. The committee should also look at the balancing between the inclination to talk about uniformity as a manifestation of commercial concern not impeding interstate commerce and the need in this context to roll in safety. The stated goal of HMTA is to maximize safety. Therefore, when safety comes at the price of some degree of absolute uniformity, that relationship has got to be taken into account.

We have got to look at the question of what appears to be exclusive reliance upon one mode of transportation to evaluate alternative modes of transportation. It seems to me, almost by definition, that reliance on alternative modes of transportation under certain circumstances, railroads, barges, may very well reduce the number of shipments—which would appear to be something desirable.

Though I appreciate the context in which we are dealing with this problem today, it is the responsibility of the committee to look at the basic law, with awareness of the points that are being brought about as a result of this discussion. So I appreciate the positions and the suggestions that have been made. They do highlight a greater responsibility, which is to look at the basic problem of transporting toxic waste, hazardous waste in general, and nuclear waste, of course, in particular.

I would be happy at this point to yield to any of the members who choose to make any brief comments in the interest of moving along.

Mr. LENT. Thank you, Mr. Chairman.

I think that the testimony of these gentlemen has been very, very illuminating—I want to commend the chairman for affording some degree of balance to these hearings.

It is my understanding, and perhaps we are losing sight of this, that under the Hazardous Materials Transportation Act, the Department of Transportation was required to promulgate rules and regulations on the whole subject of the transportation of nuclear waste. We are not talking about high-level nuclear waste here, because that comes under the NRC, but we are talking about so-called low-level waste. And the DOT has promulgated regulations governing the selection of transportation routes, and that is known as HM-164, and HM-164 requires carriers to operate over routes that minimize radiological risk.

And there is a provision in HM-164 and in the legislation that creates the HMTA for the issuance of variances from the consistency provision in the law. And New York City has, in fact, applied, pursuant to the statute and the regulations, for a variance or a waiver in this particular case. And a hearing was held and proceedings took place, comments were put before the Department of Transportation by the State of Connecticut and other jurisdictions, and the hearing book was closed on June 10, 1985, less than 45 days ago.

They reserved decision and we expect a decision sometime in the not-too-distant future. So we are, I suppose, really rehashing much of the same informational material that was before the DOT people in the administrative hearing. Of course, we don't want to preempt that work. There are certain standards in the law where you can get yourself in trouble if you try to preempt administrative agencies while they are deliberating.

Mr. FLORIO. Would the gentleman yield?

Mr. LENT. Yes.

Mr. FLORIO. Obviously the gentleman's point is there is a waiver provision in the law that is now the subject of litigation. I think the more fundamental question this committee is addressing is: Are there some basic changes in the law that should be incorporated so as to deal with the problem up front rather than wait and prolong the process through a waiver application?

So the gentleman's point is well taken, but at the same time, that does not preclude Congress' modifications in the law. These modifications can roll in legitimate concerns, in the balancing way I talked about in my remarks earlier, rather than having to rely upon contentious labor provisions and litigation.

I thank the gentleman for yielding.

Mr. LENT. I was merely making a point when we get a witness here from DOT, and I understand we have someone who will testify from DOT, we have to be conscious of the so-called Pillsbury Rule, which applies in this case. I won't go into all the details of it. I haven't looked at it in a long time. I know you cannot question an administrator too much on something that is within his or her jurisdiction and which is in the administrative process, and where a ruling has not yet been rendered, without jeopardizing in a subsequent court proceeding the validity of that ruling.

Mr. FLORIO. The time of the gentleman has expired.

Does the gentleman from New York have an observation?

Mr. SCHEUER. Just a brief comment to all three of our distinguished colleagues. I first want to thank them for their very thorough and thoughtful observations. It seems to me this is a vindication of the validation of the system for congressional hearings, where we educate ourselves and educate the public. I think this has been very useful.

I do want to say I agree completely with all of you, that a rational risk-benefit analysis and a rational solution flowing from that risk-benefit analysis would provide a fair distribution of costs. And if there are additional costs flowing from the most effective route from the point of view of risks and benefits, they should be shared. If Connecticut through this route would incur additional police costs or additional—I don't know what kind of costs, traffic control costs or whatever—conceivably somebody should reimburse Connecticut for all of those costs.

I do want to make it clear that Arthur D. Little had to do a risk-benefit analysis from the point of view of all of the people involved in this entire route, beginning at Brookhaven and ending up in Idaho. We are one people. We are the United States of America. And nobody ever told them, and they would be irresponsible and derelict in their duties if they did the risk-benefit only for the people of North Queens or the people of the Bronx or the people of Nassau, partsof which I happen to represent. Their mission was to take this point from Brookhaven to Idaho and give us from the point of view of all the people involved the route that had the maximum risk-benefit result, the least cost and the least risk to all of the people.

And if they didn't do that, they shouldn't have been paid. If they didn't do that, they would really lose all professional standing. It is inconceivable they didn't. I can't tell you on what page this was done, but I will personally apologize to the three members here today and to the chairman if the Arthur D. Little report didn't take into cognizance the risks all along the line, including the risk to the citizens of Connecticut, which is quintessential to a risk-benefit analysis of any integrity.

Mr. FLORIO. We would ask the senior member of Connecticut to turn in his crayons. If he does that, we are prepared to excuse this panel.

We are now going to hear from a panel of distinguished representatives from New York. In the interest of expediting our hearings, we would like all our witnesses to attempt to summarize their remarks here. We have a long day of hearings. Out of respect for those witnesses who will be coming forward, we would ask that their statements be put into the record in their entirety and that the gentlemen attempt to summarize their remarks for the balance of the day. The committee room is a very small room, and, therefore, again, out of respect for the witnesses, we would ask everyone to refrain from talking.

We have this panel of witnesses comprised of Hon. Mario Biaggi, Hon. Ted Weiss, Hon. Bill Green, Hon. Ben Gilman. It is my undersanding we also have a guest from the Bronx, Deputy Borough President——

Mr. BIAGGI. He is not here. The gentlemen joining us are Mark Schienberg and Lindsay Audin, who are experts in this area, and they were referred to by yourself early on. If possible, we ask they be permitted to give some testimony later on today. I think it is critical that they be here and at least acknowledge the work they have done the past several years in this area.

Mr. FLORIO. That acknowledgment has been made, and we appreciate their presence and look forward to hearing the testimony of our witnesses. At the end of the session, as I have indicated to Mr. Biaggi, when we do terminate the rest of our testimony, we will be pleased to hear briefly from those witnesses. Mr. Biaggi.

## STATEMENTS OF HON. MARIO BIAGGI, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK; HON. BENJAMIN A. GILMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK; HON. TED WEISS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK; AND HON. BILL GREEN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK

Mr. BIAGGI. Thank you.

I would like to respond to some of our colleagues from Connecticut. I was surprised to learn Congressman Morrison's mother lives in North Shore. I wonder if she knew what her son was doing.

Also, Congressman Gejdenson, in his presentation regarding the route that crosses your district, made reference to a barge. The fact is barges have been used before. This is not innovative. The Arthur D. Little consultant firm clearely stated that the barge option was 32-percent safer than the over-land route.

And I was heartened by the chairman's comment about diversification of transportation. Clearly, at this point, over-land routes, especially by truck, seem to be the only method under consideration. I couldn't agree with the chairman more, diversification of transportation methods should be studied.

My colleague, Congressman Scheuer, talked about the possibility of the State of New York paying for some of the extra costs. The fact of the matter is, we have Joe McGough here today, who is Commissioner of the Environmental Protection Department in the city of New York, with whom we have maintained extensive dialogue, and he knows full well, as I am sure he will testify, that the city of New York has paid for extra storage racks at Brookhaven to provide additional storage space and the city is prepared to pay the additional cost for barge transportation. It has been stated that New York City only wants the benefit. The fact is, New York City doesn't have Brookhaven. New York City doesn't have Shoreham. That is outside of New York City. New York City clearly wants a method of transportation that will not endanger its millions of inhabitants, as well as the other communities that are along the route, as contrasted to the population we have in Connecticut.

The gentleman from Connecticut, Mr. Morrison, made reference to a court case. I don't think he gave it all to you. The fact is the court didn't actually rule against New York City. It said it would not intervene until all of the administrative remedies were exhausted, and clearly they have not been exhausted.

I will try to comply with the chairman's request to abbreviate my comments, although it has been a long day and we put in an awful lot of time in preparation and we have been involved with this fight since the early part of last year, and we have been successful, notwithstanding initial resistence, to have postponements of shipments.

Why shouldn't they postpone? I think it was someone from the Department of Energy who said, well, if we postpone it now, there will be a belief in the community that the pressure brought this about, and we will never get it underway. I think the gentleman from Long Island, Mr. Lent, suggested that there would be sufficient space at Brookhaven to store the nuclear waste for a very considerable time. Well, you know, there is enough space out there, additional racks, to postpone any further shipments for at least 2½ years—time enough for serious consideration of other alternatives.

I believe the Department of Energy was able to halt these shipments for a number of reasons. One, DOT said they would act upon the city's application for a waiver of preemption. They were proceeding absent consideration of that waiver application. Happily, it now appears no further shipments will be made until a DOT ruling on the city's nonpreemption application.

Moratoriums? Moratoriums came notwithstanding the resistance of the Secretary of Energy; moratoriums came as the result of the valid comments that were made about the ability of the shipping cask to meet safety evaluation standards, and sure enough, there were 11 deficiencies cited by NRC in the standards evaluation.

Now they are talking about just modifying the shipping cask. We would suggest that we declare a moratorium until an alternative route is finally determined. There is more than enough space.

With reference to the legislation that I have introduced with others, we picked the figure of 50,000 as the definition of a large city. What makes it different? Well, if you have a beltway, the 50,000 population standard shouldn't bother anybody. I respect my colleagues appearing from Connecticut in opposition, I expected it, and I would be doing the same thing in their position. But I wouldn't have substance on my side. They have to speak up for Connecticut. They are attempting to paint New York City as the ogre, the big dominating ogre, with a large delegation using political power because of its numbers here in the Congress.

Well, nothing could be further from the truth. The fact is we are talking about huge population densities. You come to Co-Op City—the gentleman from New York, Mr. Scheuer knows full well, we have a population of 50,000 to 60,000, and we are less than 50 yards away from the highway, which has been called Blood Alley because of the frequency of accidents we have, where trucks overturn regularly.

To make matters worse, the nature of the present waste material is low level by comparison to the waste to be transported once the Shoreham operation is underway, it will be 20 times hotter. It is a very dangerous situation.

These are a few thoughts about the problems that made this hearing necessary. Current DOT regulations are obviously more concerned about uniformity and convenience than about overall safety. Local laws restricting or prohibiting nuclear waste shipments should be viewed on a case-by-case basis to determine their validity—those local restrictions should not be preempted in a blanket fashion like HM-164 has done, and current Federal policy simply seeks to promote an acceptable level of safety when shipping nuclear waste; it should be promoting an optimum level of safety.

Those are the broader concerns. There are also a couple of narrower problems associated with the Brookhaven situation. From the outset, DOE has demonstrated an unwarranted sense of urgency about shipping nuclear waste. For example, after 16 months, they freed up 2.5 years' worth of storage space. DOE still refuses to delay further shipments.

The Federal policy states nuclear waste shipments should avoid large urban areas where possible. In most cases, that can be accomplished by using beltways that circle around most urban areas. New York City and Denver seem to be the only major urban areas that don't have beltways. If we had them, we wouldn't have their problem.

Recent letters I have acquired from DOT and the Nuclear Regulatory Commission indicate that serious questions exist about the procedures used by DOE to certify their shipping cask. We made those arguments at the outset, so did Mr. Schienberg and Mr. Andin. They brought it to our attention, that DOE was not putting the cask through the proper test, and they were rejected and ignored. Happily, the truth has come out, and a moratorium has been declared and an alternative route for shipping has been identified and proven to be safer.

I made reference to the study showing the Connecticut route to be safer. It is 32 percent safer, clearly. This improved measure of safety is largely due to the result of a lower population density. The population density of Hartford is only 7,000 people per square mile compared to 25,000 per square mile in the Bronx and 16,000 people per square mile in Queens. The total number of high-density tracts is 13 in New York City and two in Hartford.

Yet while the facts indicate the route is significantly safer and would be the best choice to ship the waste, Connecticut is resisting this choice. I understand, but I think their resistance is based on a parochial interest. The people of Connecticut want their representatives to fight and they are fighting valiantly. We appreciate that, we understand their position, but they are still without substance.

To quote Mayor Koch, "We are not seeking to export risk, we want the safest possible route for these shipments." Let me offer some brief possible solutions: Rewrite Federal policy so that uniformity does not preempt safety when regulating nuclear waste transportation; two, Federal policy should seek to achieve an optimal level of safety, not just an acceptable level of safety; three, DOE should halt all further shipments from Brookhaven until there is a genuine need to resume them; and fourth, Federal policy should mandate, not encourage, nuclear waste shippers to avoid large urban areas.

That is why I have authored H.R. 1105, to prohibit the transportation of radioactive materials through large cities except for medical reasons or during a national emergency. I also co-sponsored Congressman Weiss' bill, H.R. 1146.

I think, Mr. Chairman, the case has been made. Once again, before closing, I would like to commend the responsible actions of the Citizens Against Nuclear Trucking, especially Lindsay Audin and Mark Schienberg, who will focus attention on this problem that has been recognized by all members of the delegation. Theirs was the lone voice in the wilderness when no one would listen and agencies wouldn't respond and completely ignored them. Time proved they were correct, and we were too.

[Testimony resumes on p. 139.]
[The prepared statement of Mr. Biaggi and attachments follow:]

**NEWS**

FROM CONGRESSMAN

**MARIO BIAGGI**

19TH CONGRESSIONAL DISTRICT, N.Y. BRONX AND YONKERS

August 1, 1985

## TESTIMONY ON THE SHIPMENT OF NUCLEAR WASTE FROM BROOKHAVEN NATIONAL LABORATORY

PRESENTED BEFORE THE HOUSE SUBCOMMITTEE ON COMMERCE, TRANSPORTATION, AND TOURISM
BY HON. MARIO BIAGGI OF NEW YORK

Mr. Chairman, I want to thank you for this opportunity to testify about a very critical issue--namely, how federal policy has allowed nuclear waste to be transported through our nation's most heavily populated area, when much safer alternatives exist.

Specifically, we are here today to examine the nuclear waste transport situation that exists at Brookhaven National Laboratory, a federal research facility on Long Island, New York, which is owned and operated by the U.S. Department of Energy. Yet, while our short-term objective must be to correct the problems that exist at Brookhaven, we cannot afford to ignore the long-term implications of the Brookhaven situation. Consider, for example, that during the last 10 years there have been an average of about 300 shipments of spent nuclear fuel in the U.S. per year. According to the Environmental Policy Institute, that number is expected to increase to nearly 9,000 shipments annually by the year 2004. Clearly, then, as we seek to identify and correct the problems that exist at Brookhaven, we should also make the necessary changes in federal policy so we prevent these problems from repeating themselves in other parts of the country

Mr. Chairman, my comments today are based on virtually a day-to-day involvement in the Brookhaven situation for well over a year, when reports first indicated that DOE was preparing to resume shipments from Brookhaven, and that those shipments would travel directly through New York City and Westchester County on a route that includes the Long Island Expressway, the Clearview Expressway, the Throgs Neck Bridge, along I-95 and 287 to the Tappan Zee Bridge and then westward to a reprocessing plant in Idaho. My basis of concern is simple--thousands of my constituents live literally within a stone's throw of the Brookhaven nuclear waste shipment route. In fact, I would venture to say that no congressional district is more directly affected by these shipments than my own.

Mr. Chairman, while there are more than a few lawyers in the room today including myself, it certainly does not take a lawyer's training to know that it is senseless to ship dangerous radioactive materials directly through our nation's most heavily populated city, when much safer routes exist. Yet, that is precisely what is happening at Brookhaven and notwithstanding the complexities of the issue, common sense dictates that such action is just plain wrong!

What brought us to this absurd debate over just how many lives might be lost by shipping nuclear waste through a large urban area, like New York City? Here are just a few thoughts on the issue:

1) current DOT regulations (specifically HM-164--issued in 1981) are obviously more concerned about uniformity and convenience than about overall safety;

(more)

2) local laws restricting or prohibiting nuclear waste shipments should be viewed on a case-by-case basis to determine their validity--those local restrictions should not be preempted in a blanket fashion like HM-164 has done; and

3) current federal policy simply seeks to promote an acceptable level of safety when shipping nuclear waste--it should be promoting an optimum level of safety.

Those are the broader concerns about federal policy that should be focused on today, Mr. Chairman, but there are also a number of narrower problems associated with the Brookhaven situation. For example:

1) From the outset, DOE has demonstrated an unwarranted sense of urgency about shipping nuclear waste from Brookhaven. Consider, for instance, that they went ahead and began shipments in January arguing that their storage space was nearing capacity. Yet, the City of New York which had already paid for six months of storage at Brookhaven, offered to pay for six more months to prevent any shipments before DOT could complete action on the City's application for non-preemption. DOE rejected this offer. Even now, after 16 shipments from Brookhaven have already been made since January, thus freeing up 2½ years worth of storage space at Brookhaven, DOE still refuses to delay further shipments, except for a brief period of time to make some modifications in their shipping cask.

2) Federal policy states that nuclear waste shipments should avoid large urban areas whenever possible. In most cases that can be easily accomplished by simply using interstate bypasses or beltways that circle around most major urban areas. However, New York City is one of the only major urban areas in the country without an interstate bypass or beltway. Instead, New York City's interstate highway system cuts directly through some of the City's most densely populated areas, including Co-op City in the Bronx, which is home for more than 50,000 of my constituents.

3) Recent letters I have acquired from DOT and the Nuclear Regulatory Commission indicate that "serious questions" exist about the procedures used by DOE to certify the safety of the MH-1A shipping cask they had been using until May to transport the nuclear waste from their Brookhaven facility. In fact, the NRC letter (dated May 22, 1985) cites 11 deficiencies in DOE's structural evaluation of the MH-1A cask. Significantly, DOE had informed DOT and others including myself, in January that all NRC concerns about the MH-1A cask had been "positively addressed." The seriousness of these concerns was highlighted by the fact that in a May 23 letter from DOT, the Department of Energy was ordered to "withdraw the cask from service until NRC has formally agreed with the resolution of the issues."

4) Instead of halting all further shipments from Brookhaven until the MH-1A cask concerns could be resolved, DOE simply switched to a much smaller GE-700 cask and continued shipments, even though there was clearly no need for any further shipments. It should be noted that the MH-1A cask holds 32 spent nuclear fuel elements and the GE-700 holds only nine. As a result, DOE would have to make 137 shipments by the end of 1987 to ship the same amount of nuclear waste that could be handled in 39 shipments using the MH-1A cask. I sent a telegram to DOE Secretary Herrington on June 28 expressing my deep concern about this significant increase in the number of nuclear waste shipments and requested "a strict moratorium on shipping" until questions surrounding the MH-1A cask could be resolved. On July 3, Secretary Herrington responded saying that he agreed the larger number of shipments posed a problem, but one of

(more)

economics, not safety. "Accordingly," he said, "the GE-700 cask is being sent to the General Electric Company for modifications to increase its capacity, and will be presented to the Nuclear Regulatory Commission for recertification when completed. Pending recertification by the NRC, further shipments from Brookhaven will be delayed."

It should be noted, Mr. Chairman, that even after the GE-700 cask is modified, it will still only be able to hold 20 spent fuel elements, more than a third less than the MH-1A cask--which translates into at least a third more shipments. For the record, Mr. Chairman, DOE made 13 shipments beginning on January 21, with the MH-1A cask, and three shipments with the GE-700 cask, before announcing the temporary delay that is now in effect. DOE officials have indicated shipments could resume using the modified GE-700 cask anytime between several weeks and up to six months from now.

5) An alternative route for shipping the Brookhaven nuclear waste has been identified and proven to be safer. In fact, the highly respected consulting firm of Arthur D. Little, Inc. recently reported that ferrying the waste across Long Island Sound from Orient Point, L.I., to New London, Connecticut, and then trucking the waste through Hartford along Interstate 84 would be 32 percent safer than the current New York City route. This improved measure of safety is largely the result of a much lower population density along the Connecticut route. For example, the population density of Hartford, the largest city in Connecticut, is only 7,000 people per square mile compared to 25,000 people per square mile in the Bronx, and 16,000 people per square mile in Queens. Further, the total number of high-density census tracts near the routes is 13 in New York City and two in Hartford.

Let me add, Mr. Chairman, that the ferry route to Connecticut is not only safer but it would also cost about the same--approximately $12,000 under the current route and $13,000 under the ferry route, and would add only about 60 miles onto an already 2,500 mile trip. Yet, while the facts clearly indicate that the ferry route is significantly safer and would obviously be the more responsible choice, efforts to reroute the waste across Long Island have been strongly resisted by the State of Connecticut.

As you know, Mr. Chairman, a State routing agency can designate a preferred alternate to the interstate highway route established by federal regulation. In the Brookhaven case, both New York and Connecticut would have to reach an agreement concerning a preferred alternate route, since both states would be affected. However, while Governor Cuomo of New York has taken the initiative to work out such an agreement at my request, the State of Connecticut has refused to even meet on the issue. In a May 10, 1985 letter from Governor Cuomo, he said, "The Director of the (NY) State Disaster Preparedness Commission, Dr. David Axelrod, has tried to develop an agreement with the State of Connecticut which would provide for the use of alternative routes. To date, the State of Connecticut has not only rejected our efforts to reach a common understanding but is actively opposing New York City's application to the Federal Department of Transportation."

Frankly, Mr. Chairman, I find Connecticut's refusal to even discuss the designation of an alternate route to be indefensible and totally irresponsible. Politically, their position might be appealing--to a Connecticut constituent. However, the issue of nuclear waste shipments is far too serious to be governed by political appeal. To quote Mayor Koch of New York City, "We are not seeking to export risk to another state. We want the safest possible route for these shipments."

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Mr. Chairman, now that I have reviewed the problem let me briefly offer some possible solutions:

1) Rewrite federal policy so that uniformity does not preempt safety when regulating nuclear waste transportation--state and local laws restricting nuclear waste shipments should be reviewed on a case-by-case basis and not simply discarded in favor of a blanket federal policy. These concerns are adequately addressed in the Weiss bill, H.R. 1146, of which I am proud to be an original cosponsor.

2) Federal policy should seek to promote an optimum level of safety--not just an acceptable level of safety--when shipping radioactive materials.

3) DOE should halt all further shipments from Brookhaven until there is a genuine need to resume them. Given the fact that there is currently 2½ years worth of empty storage space at Brookhaven, this means there should be no more shipments during that period of time. In the meantime, DOT will have ruled on New York City's non-preemption application, and DOE should be able to fully resolve all DOT and NRC concerns about their MH-1A cask--a condition for future Brookhaven shipments recently endorsed on the House floor by the Chairman of the House Subcommittee on Energy and Water Development Appropriations, Mr. Bevill.

4) When shipments do resume, no matter what the route, the larger MH-1A shipping cask--with any safety improvements that might be deemed necessary--should be used. This will result in fewer overall shipments and increased safety.

5) Federal policy should mandate--not encourage--nuclear waste shippers to avoid large urban areas. If the shipper or neighboring state is given certain discretion, it seems obvious--especially considering the history at Brookhaven--they will not necessarily choose the safest route. That is why I have authored H.R. 1105, a bill to prohibit the transportation of radioactive materials through large cities, except for medical reasons or during a national emergency. By using the interstate beltways and bypasses, as well as utilizing more fully the other modes of transport, such as ferry or barge, I believe the intent of this legislation can be easily achieved.

Finally, Mr. Chairman, it is worth examining why these changes are so important. While risk assessments vary widely, a 1980 study conducted by Sandia National Laboratories, entitled, "Transportation of Radioactive Materials in Urban Environs: Draft Environment/Assessment," calculated peaks of 1,300 latent cancer fatalities, 1,600 early morbidities, and 60 early fatalities in the case of a severe accident involving a spent fuel cask in New York City. A subsequent Sandia study later revised those figures downward, but a major conclusion seems inescapable--namely, that there is great uncertainty about the consequences of a nuclear waste accident in a large urban area.

Officials at both the Departments of Transportation and Energy argue that the chances of a nuclear waste accident involving leakage are highly remote; that every possible safety precaution has been taken. However, a Ralph Nader study revealed that there were 122 accidents involving nuclear waste shipments in 1979--the most recent year any such study was conducted. Although no injuries or deaths resulted, it seems certain that as the number of nuclear waste shipments increase, so does the risk of accident and leakage. We need only to look at the Bhopal, India tragedy to know that no matter how remote the odds, catastrophes involving hazardous materials can and do occur despite the best of precautions.

(more)

Suffice it to say that when deciding how to ship nuclear waste, we should be working with the worst-case scenario in mind--namely, that there might be an accident involving radioactive contamination. How, then, can we minimize safety risks? Avoid large urban areas when transporting nuclear waste.

Before closing, I would like to commend the responsible actions of the Citizens Against Nuclear Trucking, especially Lindsay Audin and Mark Schienberg, who have focused much needed attention on this problem and have provided valuable technical assistance to myself and others.

Mr. Chairman, at this time I wish to insert various documents to support the statements made in my testimony.

Thank you.

Mr. BIAGGI. Mr. Chairman, earlier this year I testified before the Energy and Water Development Appropriations Subcommittee about my concern that the Department of Energy was trucking high level nuclear waste through the city of New York—our Nation's most densely populated area. As the distinguished chairman of the subcommittee knows, I have a number of concerns about those shipments. However, I am particularly concerned about a recent Department of Transportation letter which raises some very serious questions about the procedures used by DOE to certify the safety of the MH-1A shipping cask they had been using to transport the nuclear waste from their Brookhaven National Laboratory. In fact, an accompanying letter from the Nuclear Regulatory Commission specifically cites 11 deficiencies in DOE's structural evaluation of the MH-1A cask.

I am deeply concerned that funds appropriated in H.R. 2959 will be used by DOE to replace the MH-1A cask with a smaller one and make further nuclear waste shipments from Brookhaven. I strongly believe that no further nuclear waste shipments should be made from Brookhaven until all of the concerns raised by DOT and NRC are satisfactorily addressed. Further, when those concerns are addressed and shipments do resume, the larger MH-1A cask should continue to be used, rather than a smaller replacement cask, in order to reduce the overall number of shipments.

At this time, I would like to engage the distinguished chairman, Mr. Bevill, in a colloquy regarding this issue, and ask the gentleman if he shares my concerns.

Mr. BEVILL. Mr. Chairman, if the gentleman will yield, let me assure the gentleman from New York that I certainly do share his concerns in this important matter. I would agree that the DOT and NRC letters raise some important questions about DOE's nuclear waste shipping policies at Brookhaven that should be fully addressed before further shipments occur.

I understand that DOE has already temporarily halted shipments from Brookhaven until certain modifications can be made in a replacement cask for the MH-1A cask. I will inform DOE of the subcommittee's concern in this matter and urge that the temporary delay in shipments be extended until all DOT and NRC concerns about the Brookhaven shipments can be fully resolved.

Mr. BIAGGI. I appreciate the chairman's concern and want to thank him for his cooperation and the active role he has pledged in helping to achieve a statisfactory solution to this troubling problem. Mr. Chairman, in an effort to discuss this problem in more detail, in 1976, the city of New York became our Nation's first locality to prohibit nuclear waste shipments through its boundaries. This prohibition effectively halted nuclear waste shipments from the Brookhaven National Laboratory, which operates a reactor on Long Island, because all roads from Long Island pass through New York City.

In 1981, after some 200 localities nationwide had enacted similar prohibitions, the Department of Transportation issued regulations preempting all of those local laws and setting uniform guidelines for the transportation of nuclear waste. The 1981 DOT regulations, referred to as HM-164, designate the interstate highway system as a preferred route when transporting large-quantity shipments of radioactive materials.

After a series of court challenges, the Department of Energy, which owns and operates Brookhaven, resumed their nuclear waste shipments on January 21, 1985. The spent nuclear fuel is being shipped along the interstate highway system through New York City, through Westchester County (NY) and then westward to a reprocessing plant in Idaho. DOE has confirmed that 16 shipments have already taken place.

Originally, DOE stated that the shipments were necessary because the storage space at Brookhaven was nearing capacity levels. However, now that 16 shipments have already been made, vacant storage space at Brookhaven is no longer a problem. In fact, it appears that Brookhaven has well over 3 years' worth of vacant storage space available.

Adding further to my concern about these nuclear waste shipments through New York City and Westchester County is the fact that a safer alternative route exists. In fact, a recent study performed by a highly reputable risk assessment firm concluded that the alternate route, which combines a ferry-highway mode of transport, is 32 percent safer, due largely to the significantly fewer people along the route.

It should be noted, too, that Federal policy states that whenever possible, major urban areas should be avoided when shipping radioactive materials. In most cases that can be easily accomplished by simply using interstate bypasses or beltways that circle around most major urban areas. However, New York City is one of the only major urban areas in the country without an interstate bypass or beltway. Instead, New York City's interstate highway system cuts directly through some of the city's most densely populated areas, including co-op city in the Bronx, which is home for more than 50,000 of my constituents and is only a stone's throw away from the nuclear waste shipment route.

As if these reasons, alone, are not enough to convince DOE to halt or at least reroute their nuclear waste shipments from Brookhaven, now comes word from the Department of Transportation that "serious questions" exist about DOE's procedures to certify the safety of the shipping cask they had been using. In fact, an accompanying letter from the Nuclear Regulatory Commission specifically cites 11 deficiencies in DOE's structural evaluation of the MH-1A shipping cask used to make the Brookhaven shipments.

At this time, Mr. Chairman, I would like to insert copies of these DOT and NRC letters:

U.S. DEPARTMENT OF TRANSPORTATION,
*Washington, DC, May 22, 1985.*

Mr. RONALD W. COCHRAN,
*Deputy Assistant Secretary for Nuclear Materials, U.S. Department of Energy, Washington, DC.*

DEAR MR. COCHRAN: Earlier this year you met with Administrator Cindy Douglass to discuss the Department of Energy's (DOE) plans to commence transportation of spent nuclear fuel from Brookhaven National Laboratory on Long Island, New York to Idaho Falls, Idaho. At that time, you discussed several topics of mutual interest, including certain questions which the Nuclear Regulatory Commission (NRC) had raised concerning the MH-1A cask which had been certified by DOE using the NRC performance standards set forth in 10 CFR Part 71.

By letter dated January 17, 1985, you stated that NRC representatives had agreed that all questions had been positively addressed in a meeting with members of your staff. Accordingly, the MH-1A cask was delivered to Brookhaven and transportation commenced shortly thereafter.

The Department of Transportation's (DOT) willingness to provide regulatory recognition of DOE approved package designs is based on the premise that the DOE evaluation and approval process will provide an assurance of safety equivalent to that required by the NRC. Such assurance can be provided only by:

1. Requiring the DOE package designs meet the standards of 10 CFR Part 71 or their equivalent, and

2. Ensuring that the evaluation methods used to demonstrate compliance with the standards are equivalent to those used by NRC in their evaluation of commercial package designs.

The requirement of 49 CFR 173.7(d) is very clear on the first point, allowing the use of DOE approved packagings only when ". . . evaluated, approved, and certified by the Department of Energy against packaging standards equivalent to those specified in 10 CFR Part 71." The second point is implicit and inescapable since equivalent safety can only be assured through the use of equivalent evaluation techniques and methodologies. Additionally, DOE has always maintained that its evaluation techniques and methodologies are at least equivalent to those of NRC.

The case of the MH-1A cask design has raised questions concerning the equivalence of these evaluation processes and DOE's compliance with section 173.7(d). On May 21, 1985, I participated in a meeting with representatives of both DOE and NRC to discuss some of the concerns which NRC had expressed earlier this year. Although these questions had been addressed earlier, it appears that they have yet to be resolved. The essence of the meeting was stated succinctly in Mr. Richard E. Cunningham's letter of May 22, 1985, to Mr. David B. Leclaire (enclosed). The premise upon which DOE based its application for NRC certification of the MH-1A cask is that it provides a level of safety far in excess of that which is actually required for the type of wastes being transported from Brookhaven. As Mr. Cunningham pointed out, this approach might not be the only way in which DOE could demonstrate that the MH-1A cask meets the standards of 10 CFR Part 71. But having taken that approach, DOE must provide the analysis to support its premise. It is this underlying analysis which NRC has preliminarily found to be defective.

Since DOE has asked NRC for an evaluation and the NRC has responded with substantial reservations, DOT must conclude that serious questions exist as to the "equivalence" of the evaluation on which DOE based its certification of the MH-1A cask. Clearly, NRC concerns must be resolved before equivalence is assured to any degree. This will require that DOE respond to the NRC concerns and withdraw the cask from service until NRC has formally agreed with the resolution of the issues.

I understand that DOE, upon being notified of NRC's concerns, voluntarily postponed a planned shipment from Brookhaven which was to have used the MH-1A cask. Pending resolution of those concerns, DOE may wish to continue the Brookhaven shipping campaign using casks other than the MH-1A. I further understand that DOE is giving consideration to revising its application for NRC certification by seeking separate approvals for: (1) use of the cask for Brookhaven type wastes, and (2) use of the cask as set forth in the original application. This is an eminently reasonable course of action.

I am sure you appreciate the seriousness of this situation and request that you keep me informed of DOE's actions to resolve the issue.

Sincerely,

L.D. SANTMAN,  
*Director, Materials Transportation Bureau.*

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MAY 22, 1985.

Mr. DAVID B. LECLAIRE,  
*Director, Office of Defense Waste and By-products Management, U.S. Department of Energy, Washington, DC.*

DEAR MR. LECLAIRE: This is to confirm matters which we brought to your attention in a meeting on May 21, 1985, concerning the Model No. MH-1A package.

As you know, we are currently reviewing an application for NRC certification of the Model No. MH-1A package. The premise upon which the application for NRC certification is based is that the package will retain all contents, including radioactive gases, following the accident condition tests in 10 CFR Part 71, Packaging and Transportation of Radioactive Material. Although this approach might not be the only way in which the package could be demonstrated to meet 10 CFR Part 71, the analysis in the application is intended to demonstrate that the package will remain leak-tight. As discussed during the May 21 meeting, our preliminary finding is that the structural portion of the analysis, as documented in the application, is defective. It does not provide a basis to support the conclusions drawn. Enclosed is a summary which identifies, in abbreviated form, our principal comments on the structural analysis.

We appreciate the prompt attention and action you are taking with respect to this matter. If you have further information about the structural analysis or further questions about the issues which you would like to discuss, we will be pleased to do so.

Sincerely,

RICHARD E. CUNNINGHAM,  
*Director, Division of Fuel Cycle and Material Safety.*

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### SUMMARY OF DEFICIENCIES IN THE STRUCTURAL EVALUATION

1. The application specifies criteria for allowable stresses but many of the calculated stresses exceed those criteria.

2. The application does not analyze the cask for various normal and accident conditions which could produce governing stress (e.g., 2 foot free drop, 30 foot oblique impact condition).

3. The application does not consider the combined effect of all the loads which act simultaneously on the containment vessel (e.g., impact and hot or cold ambient temperatures).

4. The buckling evaluation in the application is not adequate to show that the containment vessel would not buckle under 30-foot drop test conditions. The evaluation does not consider possible inelastic buckling even though stresses in the shell were calculated to be above yield. The application also does not consider the combined effect of all the loads which act simultaneously.

5. The application does not report the stresses in the closure bolts or in the drain/vent lines which pass through the lead shielding.

6. The application does not analyze the stresses in the bottom end plate of the cask or in the bottom plate of the containment vessel.

7. The application does not consider potential displacement of shielding due to "lead slump."

8. The puncture evaluation does not consider potential collapse of the top closure plate or the bottom end plate.

9. The analysis of structural interaction between the lead shielding and the containment vessel does not consider the lateral pressure exerted by the lead against the containment vessel under 30 foot drop or differential thermal expansion and contraction.

10. The finite element analysis and the stress calculations do not provide sufficient information for review. The assumptions and inputs such as element properties, loads, and loading distributions were not described in detail and justified. Although this does not constitute a fault with the analysis itself, the method of presentation is such that we cannot assess adequacy.

11. Static properties were used to analyze the redwood impact limiters for drop orientations where the redwood is crushed perpendicular to the grain. Information in a Sandia Laboratories report indicates the dynamic properties could be substantially different. Selection of the static properties for the analysis might or might not be appropriate but should be justified in light of the Sandia Laboratories report.

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Of particular concern to me, Mr. Chairman, is the fact that the NRC had raised certain questions about the MH-1A cask before it was ever used at Brookhaven, but DOE claimed in January that all of NRC's questions had been resolved and that formal NRC certification of the cask was forthcoming. According to the DOT letter, which was written in May, NRC concerns "have yet to be resolved." The DOT letter went on to say that "this will require that DOE respond to the NRC concerns and withdraw the cask from service until NRC has formally agreed with the resolution of the issues."

However, instead of halting shipments altogether at that time, DOE simply switched to a much smaller shipping cask that has NRC approval. On June 28, 1985, I sent a telegram to the Secretary of Energy, John S. Herrington, expressing concern about this switch to a smaller cask and urging that any further shipments be halted until the MH-1A cask could be used again. Specifically, I expressed concern that by using the smaller GE-700 replacement cask, DOE would be forced to make considerably more shipments overall, thus resulting in greater risk of accident. In fact, by the end of 1987, there would be 137 shipments using the smaller GE-700 cask, versus 39 shipments using the larger MH-1A cask.

Five days after I sent my telegram, DOE Secretary Herrington informed me in a July 3 letter that the switch to the GE-700 cask did present a problem, but one of economics, not safety. Specifically, the letter stated, in part:

> For some time, the Department has been analyzing the economic implications of continuing to use the GE-700 cask to transport this material. Based on our analysis we have concluded that it does not make economic sense to continue shipments using the current configuration since the number of units transported in each shipment is small. Accordingly, the GE-700 cask is being sent to the General Electric Co. for modifications to increase its capacity, and will be presented to the Nuclear Regulatory Commission (NRC) for recertification when completed. Pending recertification by the NRC, further shipments from Brookhaven will be delayed.

Frankly, I am not satisfied with this response. First of all, even after modifications are made, the GE-700 cask would still be able to hold only 30 spent nuclear fuel elements, as opposed to the 32 elements that can be carried in the MH-1A cask. The result will still be a significant increase in the overall number of nuclear waste shipments from Brookhaven.

Further, I strongly believe that no more nuclear waste shipments should be made from Brookhaven—no matter what type of cask is used—until DOE fully resolves the serious questions that have been raised by both DOT and NRC concerning their shipping policies to date. When these concerns are addressed and shipments do resume, the larger MH-1A cask should continue to be used, rather than a smaller replacement cask, in order to reduce the overall number of shipments.

I am pleased with the assurances I have received from the distinguished chairman of the Energy and Water Development Appropriations Subcommittee, and am hopeful that DOE will respond favorably to the concerns that have been expressed here on the floor today.

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SUBCOMMITTEE
CHAIRMAN, HUMAN SERVICES
CHAIRMAN, AD HOC
CONGRESSIONAL COMMITTEE
FOR IRISH AFFAIRS

July 11, 1985

The Honorable Elizabeth Hanford Dole
Secretary of Transportation
Department of Transportation
Washington, D.C. 20590

Dear Madam Secretary:

I am enclosing a very disturbing letter I recently received that originated from your Department. The letter is addressed to the Department of Energy and raises some very "serious questions" about the procedures used by DOE to certify the safety of the MH-1A shipping cask they have been using to transport nuclear waste from their Brookhaven National Laboratory on Long Island, New York.

It appears from this letter that DOE misled DOT and others in January when they stated that the Nuclear Regulatory Commission's concerns about their MH-1A shipping cask "had been positively addressed." Clearly, a number of NRC concerns about the MH-1A cask remain and I commend DOT for ordering DOE to stop using the MH-1A cask until those concerns are "formally" resolved.

However, I would urge that further action be taken in this very serious matter. DOE's efforts to mislead DOT, myself and others about the NRC's view of the MH-1A cask were improper and cast doubt on their commitment to optimum safety when making nuclear waste shipments. Due to the critical nature of this issue, these doubts cannot be ignored. Acting with this belief in mind, I strongly urge DOT to conduct a full review of DOE's nuclear waste shipping policies and to halt all further shipments from Brookhaven National Laboratory until this review is completed and all concerns are satisfactorily addressed.

Sincerely,

Mario Biaggi

MARIO BIAGGI, M.C.

MB/cwf
Enclosure

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Subcommittee
CHAIRMAN, HUMAN SERVICES
CHAIRMAN, AD HOC CONGRESSIONAL COMMITTEE FOR IRISH AFFAIRS

July 11, 1985

The Honorable John S. Herrington
Secretary of Energy
Department of Energy
Washington, D.C. 20585

Dear Mr. Secretary:

I am enclosing a very disturbing letter I recently received that was sent to your Department on May 23. The letter, which was sent by the Department of Transportation, raises some very "serious questions" about the procedures used by DOE to certify the safety of the MH-1A shipping cask you have been using to transport nuclear waste from your Brookhaven National Laboratory on Long Island, New York.

Frankly, I am deeply distressed that DOE misled DOT, myself and others in January when it was stated that the Nuclear Regulatory Commission's concerns about your MH-1A shipping cask "had been positively addressed." The DOT letter states that NRC concerns "have yet to be resolved," and DOE was ordered to "withdraw the cask from service until NRC has formally agreed with the resolution of the issues."

As one who represents a constituency that is directly impacted by the nuclear waste shipments from Brookhaven, I would appreciate receiving any comments you might have regarding DOE's actions in this very serious matter.

Sincerely,

Mario Biaggi

MARIO BIAGGI, M.C.

MB/cwf
Enclosure

US Department
of Transportation

Research and
Special Programs
Administration

400 Seventh Street S.W.
Washington, D.C. 20590

MAY 23 1985

Mr. Ronald W. Cochran
Deputy Assistant Secretary
  for Nuclear Materials
U. S. Department of Energy
Washington, DC 20545

Dear Mr. Cochran:

Earlier this year you met with Administrator Cindy Douglass to discuss the Department of Energy's (DOE) plans to commence transportation of spent nuclear fuel from Brookhaven National Laboratory on Long Island, New York, to Idaho Falls, Idaho. At that time, you discussed several topics of mutual interest, including certain questions which the Nuclear Regulatory Commission (NRC) had raised concerning the MH-1A cask which had been certified by DOE using the NRC performance standards set forth in 10 CFR Part 71.

By letter dated January 17, 1985, you stated that NRC representatives had agreed that all questions had been positively addressed in a meeting with members of your staff. Accordingly, the MH-1A cask was delivered to Brookhaven and transportation commenced shortly thereafter.

The Department of Transportation's (DOT) willingness to provide regulatory recognition of DOE-approved package designs is based on the premise that the DOE evaluation and approval process will provide an assurance of safety equivalent to that required by the NRC. Such assurance can be provided only by:

1. Requiring that DOE package designs meet the standards of 10 CFR Part 71 or their equivalent; and

2. Ensuring that the evaluation methods used to demonstrate compliance with the standards are equivalent to those used by NRC in their evaluation of commercial package designs.

The requirement of 49 CFR 173.7(d) is very clear on the first point, allowing the use of DOE-approved packagings only when "...evaluated, approved, and certified by the Department of Energy against packaging standards equivalent to those specified in 10 CFR Part 71." The second point is implicit and inescapable since equivalent safety can only be assured through the use of equivalent evaluation techniques and methodologies. Additionally, DOE has always maintained that its evaluation techniques and methodologies are at least equivalent to those of NRC.

The case of the MH-1A cask design has raised questions concerning the equivalence of these evaluation processes and DOE's compliance with section 173.7(d). On May 21, 1985, I participated in a meeting with representatives of both DOE and

NRC to discuss some of the concerns which NRC had expressed earlier this year. Although these questions had been addressed earlier, it appears that they have yet to be resolved. The essence of the meeting was stated succinctly in Mr. Richard E. Cunningham's letter of May 22, 1985, to Mr. David B. Leclaire (enclosed). The premise upon which DOE based its application for NRC certification of the MH-1A cask is that it provides a level of safety far in excess of that which is actually required for the type of wastes being transported from Brookhaven. As Mr. Cunningham pointed out, this approach might not be the only way in which DOE could demonstrate that the MH-1A cask meets the standards of 10 CFR Part 71. But having taken that approach, DOE must provide the analysis to support its premise. It is this underlying analysis which NRC has preliminarily found to be defective.

Since DOE has asked NRC for an evaluation and the NRC has responded with substantial reservations, DOT must conclude that serious questions exist as to the "equivalence" of the evaluation on which DOE based its certification of the MH-1A cask. Clearly, NRC concerns must be resolved before equivalence is assured to any degree. This will require that DOE respond to the NRC concerns and withdraw the cask from service until NRC has formally agreed with the resolution of the issues.

I understand that DOE, upon being notified of NRC's concerns, voluntarily postponed a planned shipment from Brookhaven which was to have used the MH-1A cask. Pending resolution of those concerns, DOE may wish to continue the Brookhaven shipping campaign using casks other than the MH-1A. I further understand that DOE is giving consideration to revising its application for NRC certification by seeking separate approvals for: (1) use of the cask for Brookhaven-type wastes; and (2) use of the cask as set forth in the original application. This is an eminently reasonable course of action.

I am sure you appreciate the seriousness of this situation and request that you keep me informed of DOE's actions to resolve the issue.

Sincerely,

[illegible]

L. D. Santman, Director
Materials Transportation Bureau

Enclosure

cc: (w/o encl.):
Mr. Richard E. Cunningham, Director
Division of Fuel Cycle and
Material Safety
Nuclear Regulatory Commission
Washington, DC 20555

Distribution: w/encls
RECunningham
CEMacDonald
CRChappell
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FCTC R/F

MAY 2 2 1985

Mr. David B. Leclaire, Director
Office of Defense Waste and
Byproducts Management
U.S. Department of Energy
Mail Stop A-358 GTN
Washington, DC 20545

Dear Mr. Leclaire:

This is to confirm matters which we brought to your attention in a meeting on May 21, 1985, concerning the Model No. MH-1A package.

As you know, we are currently reviewing an application for NRC certification of the Model No. MH-1A package. The premise upon which the application for NRC certification is based is that the package will retain all contents, including radioactive gases, following the accident condition tests in 10 CFR Part 71, Packaging and Transportation of Radioactive Material. Although this approach might not be the only way in which the package could be demonstrated to meet 10 CFR Part 71, the analysis in the application is intended to demonstrate that the package will remain leak-tight. As discussed during the May 21 meeting, our preliminary finding is that the structural portion of the analysis, as documented in the application, is defective. It does not provide a basis to support the conclusions drawn. Enclosed is a summary which identifies, in abbreviated form, our principal comments on the structural analysis.

We appreciate the prompt attention and action you are taking with respect to this matter. If you have further information about the structural analysis or further questions about the issues which you would like to discuss, we will be pleased to do so.

Sincerely,

Original Signed by
Richard E. Cunningham

Richard E. Cunningham, Director
Division of Fuel Cycle and
Material Safety

Enclosure: As stated

cc w/encl:
Mr. Leon D. Santman, Director
Materials Transportation Bureau
Research and Special Programs Administration
U.S. Department of Transportation
400 Seventh Street, SW
Washington, DC 20590

| FCTC | FCI |
|---|---|
| CEMacDonald:alm | RECunningham |

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## Summary of Deficiencies in the Structural Evaluation

1. The application specifies criteria for allowable stresses but many of the calculated stresses exceed those criteria.

2. The application does not analyze the cask for various normal and accident conditions which could produce governing stress (e.g., 2-foot free drop, 30-foot oblique impact condition).

3. The application does not consider the combined effect of all the loads which act simultaneously on the containment vessel (e.g., impact and hot or cold ambient temperatures).

4. The buckling evaluation in the application is not adequate to show that the containment vessel would not buckle under 30-foot drop test conditions. The evaluation does not consider possible inelastic buckling even though stresses in the shell were calculated to be above yield. The application also does not consider the combined effect of all the loads which act simultaneously.

5. The application does not report the stresses in the closure bolts or in the drain/vent lines which pass through the lead shielding.

6. The application does not analyze the stresses in the bottom end plate of the cask or in the bottom plate of the containment vessel.

7. The application does not consider potential displacement of shielding due to "lead slump."

8. The puncture evaluation does not consider potential collapse of the top closure plate or the bottom end plate.

9. The analysis of structural interaction between the lead shielding and the containment vessel does not consider the lateral pressure exerted by the lead against the containment vessel under 30-foot drop or differential thermal expansion and contraction.

10. The finite element analysis and the stress calculations do not provide sufficient information for review. The assumptions and inputs such as element properties, loads, and loading distributions were not described in detail and justified. Although this does not constitute a fault with the analysis itself, the method of presentation is such that we cannot assess adequacy.

11. Static properties were used to analyze the redwood impact limiters for drop orientations where the redwood is crushed perpendicular to the grain. Information in a Sandia Laboratories report indicates the dynamic properties could be substantially different. Selection of the static properties for the analysis might or might not be appropriate but should be justified in light of the Sandia Laboratories report.

THE SECRETARY OF ENERGY
WASHINGTON, D.C. [illegible]

July 3, 1985

Dear Mr. Biaggi:

This is in response to your telegram of June 28, 1985, regarding spent nuclear fuel element shipments from Brookhaven National Laboratory.

For some time, the Department has been analyzing the economic implications of continuing to use the GE-700 cask to transport this material. Based on our analysis, we have concluded that it does not make economic sense to continue shipments using the current configuration since the number of units transported in each shipment is small. Accordingly, the GE-700 cask is being sent to the General Electric Company for modifications to increase its capacity, and will be presented to the Nuclear Regulatory Commission (NRC) for recertification when completed. Pending recertification by the NRC, further shipments from Brookhaven will be delayed.

Your telegram further suggests that the MH1A cask is not eligible for transporting such fuel. I would like you to know that use of the MH1A cask has been previously accomplished in full conformity with applicable regulations.

I appreciate your continued interest in this subject and hope the information included in this letter is helpful in responding to your concerns.

Yours truly,

John S. Herrington
John S. Herrington

Honorable Mario Biaggi
House of Representatives
Washington, D.C. 20515

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
2358 MUNICIPAL BUILDING, NEW YORK, N.Y. 10007 (212) 566-4245

JOSEPH T. McGOUGH, JR.
Commissioner

May 29, 1985

Honorable Mario Biaggi
Member of Congress
3255 Westchester Avenue
Bronx, New York 10461

Dear Congressman Biaggi:

As you know, on December 24, 1984, the City of New York filed an application for a nonpreemption determination with the U.S. Department of Transportation together with a study by Arthur D. Little, Inc., which showed that routing Brookhaven's spent fuel around the City by use of the Orient Point to New London ferry was 9% safer than trucking it through the City by highway.

The City's application engendered a significant amount of public interest from individuals, public interest groups, congressional leaders such as you, and especially Connecticut state and local officials who took issue with various aspects of the Arthur D. Little report.

The City requested and was granted an opportunity to reply to these comments and this has resulted in the submission of Addendum 1 ("Secondary Route Comparison Factors") and Addendum 2 ("Responses and Technical Comments") copies of which are enclosed which show:

A) On the basis of a more precise and detailed comparison between Alternative 1 (the route through the City) and Alternative 3 (the route through Connecticut utilizing the Orient Point-New London ferry), Arthur D. Little has concluded that Alternative 3 is 32% safer than Alternative 1.

B) Using secondary risk comparison factors which compare evacuation capabilities, emergency response, and population density along Alternative 1 and Alternative 3, Alternative 3 (the route through Connecticut) is 15% less risky than Alternative 1 (the route through New York City).

Arthur D. Little's supplementary report was submitted to the U.S. Department of Transportation today. It clearly supports the City's application for a nonpreemption determination by demonstrating that circumnavigating the City of New York reduces overall risk while not unreasonably burdening interstate commerce.

We wanted you to have this material because it demonstrates our case even more convincingly than before, and I wish to again thank you for your continuing efforts in the fight to prohibit the shipment of spent fuel through New York City.

Very truly yours,

Joe McGough

Joseph T. McGough, Jr.
Commissioner

STATE OF NEW YORK
EXECUTIVE CHAMBER
ALBANY 12224

MARIO M. CUOMO
GOVERNOR

May 10, 1985

Dear Mario:

I share your concern regarding the routing and safe transportation of spent nuclear fuel from the Brookhaven National Laboratory. Since you may not be aware of all the actions being taken by New York State to achieve this objective, let me begin by reviewing the record.

Because the federal law preempts state law, New York State cannot ban the shipments of spent nuclear fuel over our interstate highways so long as these shipments meet federal safety regulations. Following the finding in Federal Court that New York City's ban on such shipments was illegal, the City requested a non-preempt determination from the Federal Department of Transportation on the basis that there are alternative routes which provide for a greater degree of public safety. New York State concurs, and we are supporting the City's application for a non-preemption determination.

In addition, I have written Energy Secretary Herrington requesting a temporary moratorium on further shipments from Brookhaven until such time as the City's request can be considered by the Federal government.

With respect to the designation of alternative routes for these shipments, a proposition which I support, the Director of the State Disaster Preparedness Commission, Dr. David Axelrod, has tried to develop an agreement with the State of Connecticut which would provide for the use of alternative routes. To date, the State of Connecticut has not only rejected our efforts to reach a common understanding but is actively opposing New York City's application to the Federal Department of Transportation. I have written to Governor William O'Neill and asked him to reconsider Connecticut's position and to discuss with us the various options available.

While these efforts are pursued, the State will continue to take measures to ensure that only shipments which may occur from Brookhaven are carried out in a manner which we believe to be the safest possible within the constraints of existing Federal mandates.

At my direction, each shipment receives a continuous escort from the New York State Police. Movements are made during the most appropriate hours, both from the standpoint of traffic and construction. Checkpoints are established for each Brookhaven shipment, and the State Police escort calls in as each checkpoint is reached. In this way, the progress of each shipment is checked against the schedule. Any significant delay in reaching a checkpoint would trigger the prescribed response.

A procedure has been adopted to notify the State, the affected counties and New York City in advance of scheduled shipments. A system of rapid notification of those responsible for implementation of State and local emergency response plans has been established and is based on the series of calls from preselected checkpoints by the escorting State policemen. Additional details of these escorts are necessarily confidential, but they are comprehensive and are carried out in a most professional manner. The various State agencies involved in radiological emergency response, which include the Division of State Police, the Department of Health, the State Emergency Management Office, and the Department of Transportation, have met with local health departments and Brookhaven National Laboratories to improve emergency notification and response procedures.

In summary, the State of New York has and will continue to take appropriate actions, recognizing the constraints of preemptive Federal legislation, to ensure that the transportation of spent nuclear fuel within our borders, if such shipments must occur, is conducted in the safest possible manner. We shall continue to support the petition of New York City and seek the cooperation of the State of Connecticut in the investigation and designation of possible alternative routes.

Sincerely,

Mario

Honorable Mario Biaggi
United States Representative
2428 Rayburn House Office Building
Washington, D.C. 20515

MARIO BIAGGI
19th District, New York

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**Congress of the United States**
**House of Representatives**
**Washington, DC 20515**

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CHAIRMAN, HUMAN SERVICES
CHAIRMAN, AD HOC CONGRESSIONAL COMMITTEE FOR IRISH AFFAIRS

April 15, 1985

Mr. Alan I. Roberts
Associate Director
Office of Hazardous Materials Regulation
Materials Transportation Bureau
Department of Transportation
400 Seventh Street, S.W.
Washington, D.C. 20590

Dear Mr. Roberts:

I am writing to express my full support for the application for a Nonpreemption Determination filed by the City of New York.

I have carefully reviewed the City's application and am convinced that a favorable ruling on their application for nonpreemption is in the best interest of overall public safety. The comprehensive study conducted by Arthur D. Little Inc., which was included with the City's application, identifies three safer alternative shipping routes that aovid the City of New York. These routes include 1) a chartered ferry from Orient Point, L.I. to New London,CT; 2) a barge from Shoreham to Bridgeport, CT; and 3) a chartered ferry from Port Jefferson, L.I. to Bridgeport, CT.

Further, while each of these routes would increase safety by as much as nine percent, there would be no significant increase in shipping costs. The viability of these alternative routes is further substantiated by the fact that in 1976, the Department of Energy made six shipments of spent fuel from Brookhaven National Laboratories by ferry from Orient Point, Long Island to New London, CT.

Simply put, there appears to be no logical reason for shipping radioactive materials through our nation's most densely populated area, especially since safer alternative routes have been proven to exist. Obviously, an accident involving radioactive leakage in a large urban area like New York City would be far more catastrophic than if such an accident occurred in less populated areas. Risk assessments vary widely, but even the most conservative projections cite thousands of cases of radiation poisoning if an accident involving leakage occurred in a large urban area. Further, a Nuclear Regulatory Commission study concluded there could be as much as $4 billion in damage costs, including the cost of totally evacuating the area surrounding the leakage. Granted, a nuclear waste transport accident involving leakage may be remote, but we need only look as far as the Bhopal, India tragedy to know that no matter how stringent the precautions, hazardous material accidents can and do occur.

Suffice it to say that when deciding how to ship nuclear waste, we should be working with the worst-case scenario in mind. That means large cities, like New York, should be avoided when transporting nuclear waste. DOT's own stated policy appears quite consistent with this logic. Consider, for example, that HM-164 requires carriers to avoid cities where possible by the use of circumferential routes--i.e. Interstate System bypasses or beltways. Unfortunately, New York City is one of the only major urban areas in the country without an interstate bypass or beltway. Instead, New York City's interstate highway system cuts directly through some of the City's most densely populated areas, including Co-op City in the Bronx, which is home for some 50,000 of my constituents and is only a stone's throw away from the nuclear waste shipment route.

It should be noted that the section of the I-95 shipping route that passes close to Co-op City has been appropriately labeled "Blood Alley" for the exceedingly high number of traffic accidents that have taken place along that dangerous stretch of highway. Efforts are underway to improve safety along the Bronx I-95 highway corridor, but those safety improvements are not expected to be completed until sometime next year, and in the meantime the highway construction which is already resulting in lengthy traffic delays along the nuclear waste shipping route, will add to the potential dangers that already exist.

I feel strongly that if DOT is concerned enough to require carriers to avoid cities where possible by the use of Interstate bypasses or beltways, a similar requirement should exist directing carriers to use inter-modal routes, such as those recommended by the Arthur D. Little study, to avoid cities where possible.

Sincerely,

Mario Biaggi

MARIO BIAGGI, M.C.

MB:cf/mm

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CHAIRMAN, AD HOC CONGRESSIONAL COMMITTEE FOR IRISH AFFAIRS

March 22, 1985

The Honorable Tom Bevill
Chairman
Subcommittee on Energy and Water Development
2362 Rayburn HOB
Washington, D.C. 20515

Dear Mr. Chairman:

It has come to my attention that officials from the Department of Energy will be testifying before your Subcommittee on Tuesday, March 26. I am enclosing several questions about an issue of great concern to my constituents, which I am hopeful can be asked on my behalf at that hearing.

Specifically, these questions deal with the Department of Energy's decision to transport nuclear waste by truck directly through the City of New York, even though alternate shipping routes exist (and have been proven to be safer). Any assistance you provide in getting the Department of Energy to address this issue would be greatly appreciated. My staff contact on this issue is Craig Floyd at 5-2464.

Sincerely,

Mario Biaggi

MARIO BIAGGI, M.C.

MB:cf/mm
Enclosure

## Questions Submitted by Rep. Mario Biaggi on Shipping Nuclear Waste Through New York City

1) Beginning on January 21, DOE began shipping nuclear waste by truck from its Brookhaven National Laboratory through the City of New York--our nation's most densely populated area. Five shipments have already been confirmed and many others are expected. A study conducted by Arthur D. Little, Inc., concluded that there are at least three alternative routes--all of which avoid New York City--that would increase safety without any significant increase in cost. Since U.S. Department of Transportation regulations direct nuclear waste shippers to avoid major urban areas whenever possible, it would seem that DOE should use one of those alternate routes. Is DOE familiar with this study and, if so, why has DOE chosen not to use one of the alternative routes?

2) Originally, DOE had said these nuclear waste shipments were necessary because the storage space at Brookhaven was nearing capacity. However, now that at least five shipments have been made and the City of New York has paid for an extra six months of storage at Brookhaven, there would appear to be well over a year of vacant storage space at Brookhaven. Why is DOE continuing the shipments if there is plenty of on-site storage at Brookhaven available?

3) The City of New York has filed a non-preemption application with the U.S. Department of Transportation. DOT is conducting a thorough review of that application to determine if, in fact, there are good reasons to avoid the City of New York. Since a decision by DOT is expected by July, and since there appears to be enough storage space at Brookhaven to last well beyond July, why doesn't DOE simply stop any further shipments until after DOT has made a decision on the City's non-preemption application?

4) What, in DOE's opinion, would be the worst-case scenario in terms of health and property damage if there were an accident along the New York City route and radioactive contamination occurred? What evidence does DOE rely on to reach such conclusions?

5) New York City not only is our nation's most populated City, but it is also unique for another reason. Unlike other major urban areas, there is no interstate bypass or beltway that allows traffic to avoid its most populated areas. Instead, New York City's interstate highway system cuts right through its most populated areas. Wouldn't common sense suggest that shipping nuclear waste along such a route, by truck, poses a far greater risk to public safety than shipping the waste by some other route? Has DOE considered shipping their nuclear waste by another route?

6) What factors would be required for DOE to use an alternate to the New York City route?

## ]SHIPMENTS OF BROOKHAVEN NATIONAL LABORATORY SPENT FUEL THROUGH NEW YORK CITY[

Mr. Biaggi: Beginning on January 21, 1985, the Department of Energy began shipping spent nuclear fuel from its Brookhaven National Laboratory through the City of New York--our nation's most densely populated area. My question to you, sir, is--in view of the Arthur D. Little, Inc., study that concluded that there are at least three safer routes, why has the Department of Energy chosen not to use one of the alternate routes?

Mr. Hoover: The designation of routes is not within the regulatory purview of the Department of Energy, but rather rests with the Department of Transportation. We have worked closely with New York City officials regarding a preferred interstate highway route to use on these shipments. I understand that none of the recommended routes examined in the Arthur D. Little study have been designated for use at this time.

Mr. Biaggi: Why is the Department of Energy continuing the shipments if there is plenty of onsite storage available at Brookhaven?

Mr. Hoover: The Department of Energy does not believe continued storage of spent fuel at the Brookhaven National Laboratory facility is a viable option. This spent fuel contains materials that represent a government investment of about $9 million and should be made available to the Department to assure cost effective use of federal resources. The relative risks associated with transporting this spent fuel by highway have been exhaustively studied by the Department of Transportation and the Nuclear Regulatory Commission with the conclusions that such risks are extremely low. Therefore, we see no inherent benefit in further delaying shipping.

Mr. Biaggi: The City has filed a nonpreemption application with the U.S. Department of Transportation. Since the Department of Transportation expects to make a decision by July, and enough storage space is available at

Brookhaven National Laboratory to last well beyond July, why doesn't the Department of Energy simply stop shipments until the Department of Transportation has made their decision?

Mr. Hoover: The Department of Energy has looked carefully at the City's nonpreemption application and the attached study. We found no sufficiently compelling reason to stop shipments until the Department of Transportation evaluation is completed. We have the utmost confidence that these shipments can be carried out without significant risk to the health and safety of the public.

Mr. Biaggi: Has the Department of Energy considered routes other than truck that poses less risk around the densely populated areas of New York City?

Mr. Hoover: During the shipment planning stages, the Department of Energy worked closely with City officials to determine their desires in routing the Brookhaven spent fuel traffic. Use of a partial water route across to Connecticut was one of the City's suggestions, but it was necessary for the Department of Energy to assure that the route used met with the Department of Transportation's highway routing rule HM-164. That rule dictates the use of the interstate highway system or alternates designated by a State routing agency. No approved alternate was then, or is now, available to the Department of Energy for these shipments. Further, the State of Connecticut has strongly opposed the attempts by Brookhaven National Laboratory to use waterborne routing concepts through that State.

Mr. Biaggi: What, in the Department of Energy's opinion, would be the worst-case scenario in terms of health and property damage if there were an accident along the New York City route and radioactive contamination occurred? What evidence does the Department of Energy rely on to reach such conclusions?

Mr. Hoover: The Department of Energy and the Nuclear Regulatory Commission postulated a series of independent tests that went far beyond any credible accident. This was a malevolent attack on a spent fuel cask with high explosives. The worst case dispersion of fuel amounted to 31 grams total. Even in this test, which went far beyond any credible accident, the dispersion of materials in respirable form was found to cause only one potential latent cancer fatality.

Mr. Biaggi: What factors would be required for the Department of Energy to use an alternate to the New York City route?

Mr. Hoover: Although packaging design and integrity are the primary elements in ensuring public safety, the Department of Energy would be willing to use any alternate route so designated by State routing authorities as long as it meets the Department of Transportation's routing regulations.

THE DEPUTY SECRETARY OF ENERGY
WASHINGTON, D.C. 20585

February 27, 1985

Honorable Mario Biaggi
House of Representatives
Washington, D.C. 20515

Dear Mr. Biaggi:

Former Secretary of Energy Donald Paul Hodel asked me to thank you for your letter of January 29, 1985, regarding the safety of the shipments of spent fuel from Brookhaven National Laboratory (BNL). He was pleased to meet with members of the New York delegation on February 4, 1985, to reaffirm that this Department is in complete agreement with you that the transportation of the BNL spent fuel must be carried out safely.

The safety of all citizens is of paramount importance to the Department in its hazardous materials packaging and transportation activities. For this reason, the Department has implemented and continuously verifies compliance with a complete list of procedures that assures the safety and security of all radioactive materials shipments.

Quality assurance and safety inspections are performed for each BNL spent fuel shipment by a number of expert technicians under the supervision of the engineering staff of the BNL reactor division. These inspections are in accordance with the Safety Analysis Report for Packaging procedures that were developed specifically for the type of cask being used and assure that loading, tiedowns, vehicle operations, and appropriate documentation follow applicable Federal regulations. The personnel responsible for these activities have received extensive training in these procedures and are highly qualified to perform these tasks. Finally, in coordination with the State of New York, a thorough vehicle inspection is performed on each shipment by the State Police official who is providing escort service.

Please be assured that safety and security considerations will continue to be given the highest priority in all packaging and transportation activities of the Department.

Sincerely,

Danny J Boggs

Danny J. Boggs

MARIO BIAGGI
19TH DISTRICT, NEW YORK

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FOR IRISH AFFAIRS

February 8, 1985

The Honorable John S. Herrington
Secretary of Energy
Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Mr. Secretary:

As you assume your new responsibilities as U.S. Secretary of Energy, I want to share with you my longstanding concerns about the shipment of nuclear waste from DOE's Brookhaven National Laboratory on Long Island.

Specifically, I am concerned that last month DOE began trucking the nuclear waste from Brookhaven through New York City, Westchester County and other neighboring communities, despite my formal protests and those of other elected officials from New York. My reasons for opposing DOE's decision are twofold. First, it is my understanding that Brookhaven now has approximately 10 months in additional storage capacity, more than enough to allow any further shipments of nuclear waste to be delayed until the U.S. Department of Transportation acts on New York City's application for non-preemption--a decision that is expected by the end of May. New York City has offered to purchase additional storage space if it is necessary.

Second, a recent study conducted by Arthur D. Little, Inc., concluded that there are at least three alternative routes safer than the New York City interstate route now being used by DOE--all using a combination of highway and barge or ferry transport across Long Island Sound to Connecticut. New York City has also offered to pay for any added costs this rerouting might require, at least until DOT reaches a decision on the City's non-preemption application.

Simply put, there would appear to be no need to make any further shipments until after DOT acts on the City's non-preemption application. I am hopeful you will agree with this logic, and will halt any further shipments of nuclear waste from Brookhaven until after DOT acts on the City's non-preemption application. When shipments do resume, I would also urge that DOE give favorable consideration to one of the safer routes recommended by the Arthur D. Little study. Clearly, both of these actions would help to promote overall safety.

I would appreciate receiving your views on this matter of extreme importance.

Sincerely,

Mario Biaggi

MARIO BIAGGI, M.C.

MB:cf/mm

THE SECRETARY OF ENERGY
WASHINGTON, D.C. 20585

March 18, 1985

Honorable Mario Biaggi
House of Representatives
Washington, DC 20515

Dear Mr. Biaggi:

I have carefully considered the request contained in your letter of February 8, 1985, seeking a delay in the shipment of spent fuel from Brookhaven National Laboratory pending a final decision from the Department of Transportation on New York City's application for nonpreemption.

The Department's primary reason for delaying Brookhaven National Laboratory's spent fuel shipments in July 1984 was to accommodate use of the larger MH-1A cask, which reduces the total number of shipments. Since the larger cask was not available until January 1985 and because the City was also interested in a delay to conduct a study on alternative shipping routes, the City offered to pay for the costs to provide for additional storage capacity until the MH-1A was certified and ready for use. The agreement with the City provides that Brookhaven National Laboratory shipment of spent fuel should not be delayed pending the completion of studies relating to alternative shipping modes or routes.

Research shows that the relative risks associated with these activities are not substantial. Moreover, the extensive regulatory process overseeing the transportation and packaging process was specifically designed to ensure public health and safety. Studies conducted by the Department of Transportation and the Nuclear Regulatory Commission reach this same conclusion and emphasize that the radiological risks in transporting radioactive materials resulting from both normal exposure and in accident conditions are very low by any level of comparison.

It should be noted that although review of the transportation route and modes is important, Federal regulations governing radioactive materials shipments emphasize the packaging design and integrity as the primary element in ensuring public safety. These regulations require a variety of stringent impact, puncture, fire, and water immersion tests be conducted to confirm engineering adequacy of the spent fuel shipping casks. Research and actual testing show that spent fuel casks can withstand any credible accident without loss of contents that would pose a threat to life or damage to property.

In an attempt to provide further assurances to the public along the spent nuclear fuel routes, the Department's Chief of Transportation at Headquarters and the Manager of the Brookhaven Area Office have had numerous meetings during the past several months with New York State, City, and local officials and groups of concerned citizens. The most recent meeting was held on February 14, 1985, at the request of Westchester County Executive Andrew P. O'Rourke and other elected officials of the Westchester municipalities through which the Brookhaven spent nuclear fuel is being transported. At that meeting and numerous other meetings on this subject, the Departmental packaging and transportation safety policies, including implementation procedures, were discussed in detail.

I have every confidence in our ability to carry out these shipments without significant risk to the public and, for that reason, I find no sufficiently compelling reason to delay these shipments until the Department of Transportation's evaluation is completed.

Sincerely,

John S. Herrington

JOHN S. HERRINGTON

MARIO BIAGGI
[illegible]

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[illegible]
Washington, D.C. 20515
[illegible]

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BRONX
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Bronx, New York [illegible]
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YONKERS
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Yonkers, New York 10704
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Congress of the United States
House of Representatives
Washington, D.C. 20515

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EDUCATION AND LABOR
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ELEMENTARY, SECONDARY AND
VOCATIONAL EDUCATION
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CONGRESSIONAL PORT CAUCUS
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CHAIRMAN,
MERCHANT MARINE
COAST GUARD AND NAVIGATION
SELECT COMMITTEE ON
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CHAIRMAN, HUMAN SERVICES
CHAIRMAN, AD HOC
CONGRESSIONAL COMMITTEE
FOR IRISH AFFAIRS

January 15, 1985

The Honorable Mario Cuomo
c/o Mr. Brad Johnson
New York State Office
444 N. Capitol Street
Suite 301
Washington, D.C. 20001

Dear Governor Cuomo:

I am contacting you on a matter of great urgency, which requires your immediate attention. The Brookhaven National Laboratory on Long Island is scheduled to begin trucking spent nuclear fuel through densely populated areas in New York City within the next month. These shipments will be made in compliance with U.S. Department of Transportation Rule HM-164, which seeks to maximize the use of interstate highway systems when transporting radioactive materials.

It should be noted that while carriers are required to use an "interstate system bypass or beltway" around a city when available, the City of New York is unique in that it is one of the only major population centers in the U.S. without an interstate system bypass or beltway. As a result, many of the City's more than seven million residents would be directly impacted by these shipments.

However, there is a way to prevent these shipments from moving through New York City, but it requires immediate action on your part. While there is no highway route around the City for shipments emanating from Long Island, there are inter-modal routes available, using a combination of highway and barge or ferry transport to circumnavigate the City of New York. In fact, a recent study conducted by Arthur D. Little, Inc., concluded that there are at least three alternative inter-modal routes that are safer than the New York City highway route. They are: (1) a chartered ferry from Orient Point, L. I. to New London, Connecticut; (2) a barge from Shoreham to Bridgeport, Connecticut; and (3) a chartered ferry from Port Jefferson, L. I. to Bridgeport, Connecticut.

The Honorable Mario Cuomo
January 15, 1985
page two

Each of these routes, however, would involve the use of more non-interstate highway (approximately six miles more) than the New York City route. As a result, the only way these inter-modal routes could be used is if New York State, in "substantive consultation" with the State of Connecticut, designated one of them as an "alternative preferred highway route." Since the Arthur D. Little study already provides the quantitative analysis supporting this alternative highway route designation, an initiative on your part, in consultation with the State of Connecticut, is all that is needed to spare the City of New York considerable and needless danger.

It should be noted that, for the most part, the Connecticut highways to be used under either of these three inter-modal routes are already being utilized for the shipment of nuclear waste.

I strongly urge you to act promptly to designate one of the inter-modal routes as an "alternative preferred highway route." Such action would be not only in the best interests of New York State, but would also help to promote "overall" safety.

Sincerely,

Mario Biaggi

MARIO BIAGGI, M.C.

MB/cwf
Enclosure

STATE OF NEW YORK
EXECUTIVE CHAMBER
ALBANY 12224

MARIO M. CUOMO
GOVERNOR

January 22, 1985

Dear Mario:

I have asked Dr. David Axelrod, as Chairman of the New York State Disaster Preparedness Commission, to evaluate the shipment of Brookhaven's spent nuclear fuel across the Long Island Sound and through Connecticut. He has a copy of the Arthur D. Little report and will contact Connecticut immediately.

Because of my concerns for potential problems associated with the transport, I have directed the State Police to escort any shipments of spent nuclear fuel through New York State. We have also sought to avoid major population centers wherever possible. Any feasible alternative to the proposed route through New York City deserves our serious consideration. I will keep you apprised of our discussions with the State of Connecticut.

Sincerely,

Mario

Honorable Mario Biaggi
Member of Congress
U.S. House of Representatives
2428 Rayburn House Office Building
Washington, D.C. 20515

STATE OF NEW YORK
DEPARTMENT OF HEALTH
ALBANY

DAVID AXELROD, M.D.
COMMISSIONER

January 17, 1985

Dear Colonel Forst:

Governor Cuomo has asked me to evaluate the proposed shipment of spent nuclear fuel from Brookhaven National Laboratory on Long Island through New York City. These shipments, suspended since 1976, are to resume soon.

The City of New York commissioned a study by Arthur D. Little, Inc. of Cambridge, Massachusetts of alternatives to shipment through New York City. This study suggested three alternative routes each of which involve shipment across Long Island Sound by barge or ferry and then through Connecticut and New York to disposal sites.

I have enclosed for your review a copy of the Arthur D. Little report. I will be contacting you in the immediate future to explore the feasibility of the alternative shipment routes.

Sincerely,

David Axelrod, M.D.
Commissioner of Health

Colonel Lesten J. Forst
Commissioner of Public Safety
State Police Headquarters
100 Washington Street
Hartford, Connecticut 06106

Enclosure

THE SECRETARY OF ENERGY
WASHINGTON, D.C. 20585

January 18, 1985

Honorable Mario Biaggi
House of Representatives
Washington, DC 20515

Dear Mr. Biaggi:

This responds to your letter of December 21, 1984, requesting that we refrain from shipping spent fuel from Brookhaven National Laboratory (BNL) until the Department of Transportation (DOT) has issued a ruling on New York City's application for a non-preemption determination.

Based on discussions with the DOT, we believe that it is unlikely that a final decision on the City's application for a non-preemption determination will be reached in time to accommodate storage capacity restrictions. Accordingly, the delay in shipping that you request would substantially disrupt planned BNL activities and could jeopardize facility safety considerations.

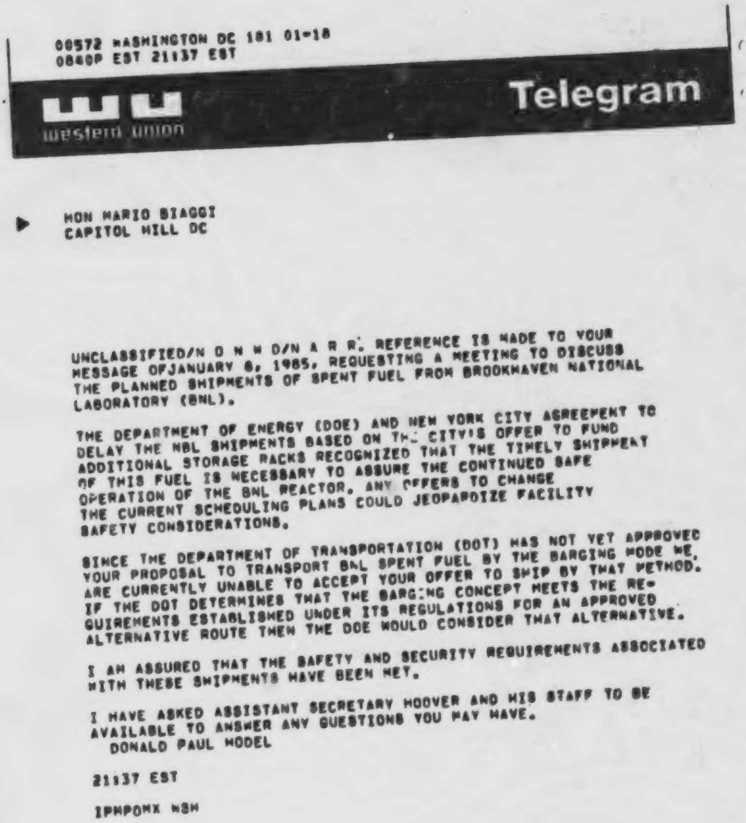
The Department of Energy must plan storage capacity well in advance of its need. This is evidenced by our agreement with New York City to provide additional storage racks 6 months prior to use. The older spent fuel storage racks at BNL were filled by the end of 1984. The new storage racks have now been placed into service. Failure to ship the spent fuel as planned would require additional storage racks, which are not now available. Safety factors require flexibility in the storage system to account for a possible full core discharge. Existing storage space cannot be committed to routine operations.

We understand that your constituents have raised concerns about the safety of these shipments. However, we have expended extraordinary effort and money over an extended period of time to eliminate risk to the public. I have confidence in our ability to carry out these shipments with extreme care and diligence to minimize risk to public health and safety. Given the current circumstances, we must decline your request to agree to a further delay of the spent fuel shipments from BNL.

Sincerely,

Donald Paul Hodel

DONALD PAUL HODEL



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western union
Telegram

HON MARIO BIAGGI
CAPITOL HILL DC

UNCLASSIFIED/N O N W D/N A R R. REFERENCE IS MADE TO YOUR MESSAGE OFJANUARY 6, 1985, REQUESTING A MEETING TO DISCUSS THE PLANNED SHIPMENTS OF SPENT FUEL FROM BROOKHAVEN NATIONAL LABORATORY (BNL).

THE DEPARTMENT OF ENERGY (DOE) AND NEW YORK CITY AGREEMENT TO DELAY THE NBL SHIPMENTS BASED ON THE CITY'S OFFER TO FUND ADDITIONAL STORAGE RACKS RECOGNIZED THAT THE TIMELY SHIPMENT OF THIS FUEL IS NECESSARY TO ASSURE THE CONTINUED SAFE OPERATION OF THE BNL REACTOR. ANY OFFERS TO CHANGE THE CURRENT SCHEDULING PLANS COULD JEOPARDIZE FACILITY SAFETY CONSIDERATIONS.

SINCE THE DEPARTMENT OF TRANSPORTATION (DOT) HAS NOT YET APPROVED YOUR PROPOSAL TO TRANSPORT BNL SPENT FUEL BY THE BARGING MODE WE, ARE CURRENTLY UNABLE TO ACCEPT YOUR OFFER TO SHIP BY THAT METHOD. IF THE DOT DETERMINES THAT THE BARGING CONCEPT MEETS THE RE-QUIREMENTS ESTABLISHED UNDER ITS REGULATIONS FOR AN APPROVED ALTERNATIVE ROUTE THEN THE DOE WOULD CONSIDER THAT ALTERNATIVE.

I AM ASSURED THAT THE SAFETY AND SECURITY REQUIREMENTS ASSOCIATED WITH THESE SHIPMENTS HAVE BEEN MET.

I HAVE ASKED ASSISTANT SECRETARY HOOVER AND HIS STAFF TO BE AVAILABLE TO ANSWER ANY QUESTIONS YOU MAY HAVE.
DONALD PAUL HODEL

21:37 EST

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HON MARIO BIAGGI
CAPITOL HILL DC

UNCLASSIFIED/N O N W D/N A R R. REFERENCE IS MADE TO YOUR MESSAGE OF JANUARY 8, 1985, REQUESTING A MEETING TO DISCUSS THE PLANNED SHIPMENTS OF SPENT FUEL FROM BROOKHAVEN NATIONAL LABORATORY (BNL). THE DEPARTMENT DOES NOT FIND THE BARGING/FERRYING ALTERNATIVE SHIPPING MODES WHICH YOU HAVE SUGGESTED NECESSARY FOR THE SAFE SHIPMENT OF SPENT FUEL. WHILE WE USED THAT TRANSPORTATION METHOD IN 1976 WHEN NEW YORK CITY EFFECTIVELY BANNED SHIPMENTS THROUGH THE CITY, THE STATE OF CONNECTICUT SUBSEQUENTLY OPPOSED THAT ROUTING CONCEPT.

SINCE THE DEPARTMENT OF TRANSPORTATION (DOT) HAS NOT YET APPROVED YOUR PROPOSAL TO TRANSPORT BNL SPENT FUEL BY THE BARGING MODE WE. ARE CURRENTLY UNABLE TO ACCEPT YOUR OFFER TO SHIP BY THAT METHOD. IF THE DOT DETERMINES THAT THE BARGING CONCEPT MEETS THE REQUIREMNTS ESTABLISHED UNDER THEIR REGULATIONS FOR AN APPROVED ALTERNATIVE ROUTE THEN THE DEPARTMENT OF ENERGY WOULD CONSIDER THAT ALTERNATIVE.

THE TIMELY SHIPMENT OF THIS FUEL IS NECESSARY TO ASSURE THE CONTINUED SAFE OPERATION ON THE BNL REACTOR, I AM ASSURED THAT THE SAFETY AND SECURITY REQUIREMENTS ASSOCIATED WITH THESE SHIPMENTS HAVE BEEN MET.

I HAVE ASKED ASSISTANT SECRETARY HOOVER AND HIS STAFF TO BE AVAILABLE TO ANSWER ANY QUESTIONS YOU MAY HAVE.
DONALD PAUL HODEL

21:32 EST

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Telegram

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Send the following message, subject to the Telegraph Company's conditions, rules and regulations, which are on file with regulatory authorities.

JANUARY 8, 1985

THE HONORABLE DONALD PAUL HODEL
SECRETARY OF ENERGY
DEPARTMENT OF ENERGY
1000 INDEPENDENCE AVENUE, SW
WASHINGTON, D.C. 20585

DEAR MR SECRETARY:

WE WOULD LIKE TO REQUEST A MEETING WITH YOU AT YOUR EARLIEST POSSIBLE CONVENIENCE TO DISCUSS YOUR DECISION TO BEGIN NO LATER THAN FEBRUARY TO TRUCK NUCLEAR WASTE FROM BROOKHAVEN NATIONAL LABORATORY THROUGH NEW YORK CITY. SPECIFICALLY, WE WOULD LIKE TO BE BRIEFED ON THE REASONS FOR YOUR DECISION. IN ADDITION, WE WOULD LIKE TO DISCUSS THE POSSIBILITY OF BARGING THE NUCLEAR WASTE, AT LEAST UNTIL SUCH TIME AS DOT REACHES A FINAL DECISION ON THE CITY'S APPLICATION FOR NON-PREEMPTION, WITH THE CITY ASSUMING ANY ADDED COSTS THAT BARGING WOULD REQUIRE. WE WOULD ALSO REQUEST THAT OTHER INTERESTED MEMBERS OF THE NEW YORK CONGRESSIONAL DELEGATION BE ALLOWED TO ATTEND, AS WELL AS NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION COMMISSIONER JOSEPH T. MCGOUGH, JR. WE AWAIT YOUR RESPONSE.

SINCERELY,

MARIO BIAGGI, M.C.

JAMES SCHEUER, M.C.

EDWARD I. KOCH
MAYOR OF NEW YORK CITY

CC: ROBERT C. ODLE, JR.
ASSISTANT SECRETARY
CONGRESSIONAL, INTERGOVERNMENTAL, AND
PUBLIC AFFAIRS
DEPARTMENT OF ENERGY
WASHINGTON, D.C. 20585

THE SECRETARY OF ENERGY
WASHINGTON, D.C. 20585

December 6, 1984

Honorable Mario Biaggi
House of Representatives
Washington, DC 20515

Dear Mr. Biaggi:

Thank you for your letter of October 25, 1984, regarding the spent fuel shipments moving from Brookhaven National Laboratory (BNL) on Long Island, New York.

With respect to your concerns about the operational planning of these shipments, we have provided as an enclosure specific responses to the comments expressed in your letter. As you will note from these responses, the safety of all citizens remains of paramount importance to the Department in its transportation activities.

It is essential that the Department maintain the schedule outlined in its July 12, 1984, agreement with New York City. An indefinite shipping delay could seriously compromise safety considerations at the BNL facility. Therefore, given the current circumstances we must decline your request to agree to a further delay of the spent fuel shipments from BNL.

Sincerely,

Donald Paul Hodel

DONALD PAUL HODEL

Enclosure

## SPENT FUEL SHIPMENTS FROM BROOKHAVEN NATIONAL LABORATORY (BNL)

1. Concern: A comprehensive study on alternative methods of transporting the spent fuel will be completed and ready for submission to the U.S. Department of Transportation, along with a waiver of preemption application from the City of New York by the end of November 1984. Although I have urged DOT Secretary Dole to expedite the review process of this study, it is uncertain at this time whether any final decision on the City's application can be reached before the first scheduled waste shipments.

   Comments: We agree with your assessment that it is unlikely that a final decision will be reached by the Department of Transportation (DOT) before the first scheduled shipment date given the complexity of the issue. The Department must, however, plan for shipping these materials well in advance of their actual movement, as evidenced by our agreement with New York City to build additional storage capabilities 6 months prior to use. Accordingly, an indefinite delay would substantially disrupt planned BNL activities and could jeopardize facility safety considerations.

2. Concern: It has come to my attention that the added storage capacity at Brookhaven, which was funded by the City of New York, has not been utilized to date. Thus, it would appear that Brookhaven should have enough storage capacity for at least the next 6 months.

   Comments: The current spent fuel storage racks at BNL will be filled by the end of 1984. The new storage racks will then be placed into service. Failure to ship the spent fuel as planned would require additional storage racks, and a decision to construct these racks would have to be made by January 1985. Safety factors require flexibility in the storage system to account for a possible full core discharge. This space cannot be committed to routine operations.

3. Concern: If current storage capacity does create a problem, it would seem that the larger MH-1A casks, which can hold up to 32 elements, could provide whatever additional storage space might be necessary at Brookhaven until all other issues are resolved.

   Comments: The use of the MH-1A spent fuel shipping casks for storing reactor fuels at Brookhaven is not feasible. These casks will be used for the shipment of fuels from other facilities in addition to Brookhaven. We cannot divert the limited number of casks from other user needs.

4. Concern: Safety concerns regarding the larger MH-1A casks must be addressed. Consider, for example, that these casks have not been approved by the Nuclear Regulatory Commission (NRC), which has stated that these casks should have fire shields to better protect against leakage in the event of a crash, fire, or lead meltdown. DOE has indicated a willingness to add the fire shields and obtain NRC approval of these casks, but this process may prevent the larger casks from being used for the first nuclear waste shipments, resulting in increased risks to New Yorkers, and increased costs to DOE.

   Comments: The Department of Energy (DOE) plans to use the MH-1A casks by virtue of its authority to issue Federal package certifications pursuant to title 10 CFR 71 standards. Certifications are granted on the basis that the safety of the proposed shipping container has been adequately analyzed and that use of the container poses no unacceptable risk to the health and safety of the public.

   We are in the final stages of review before issuing a DOE certificate for use of the MH-1A casks. The Safety Analysis Report for Packaging (SARP) was submitted to the NRC last year and based on their review and discussions between our staffs a number of changes were initiated and will be completed prior to use of the cask in shipment operations. One principal change to the MH-1A casks is the installation of fire shields. Fire shields have been fabricated and will be installed on the MH-1A prior to its use. We now anticipate that these casks will be available for Brookhaven in early 1985.

5. Concern: A $50 million highway safety improvement project is scheduled to begin early next year, with many of the repairs to be made along the proposed shipping route (New England Thruway). I have contacted the New York State Department of Transportation and the New York Thruway Authority to urge that these safety improvements along the shipping route be expedited and completed, if possible, before the waste shipments begin. However, it now appears that none of the highway safety improvements will be done in time if the shipments begin as currently scheduled.

   Comments: The excellent safety record of over 40 years without any death or injury related to the radioactive nature of the material confirms the effectiveness of the transportation regulatory framework which emphasizes packaging design and integrity as the primary ingredient in assuring public safety. The highway safety improvements you have outlined are an important consideration in the transportation of all materials, whether they are hazardous or nonhazardous materials. However, the spent fuel shipping cask will provide the required protection to ensure there is no adverse radiological incident. It is our intention to assure that every effort is made to maximize public safety on these shipments.

THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

DEC 6 1984

The Honorable Mario Biaggi
U. S. House of Representatives
Washington, D. C. 20515

Dear Mario:

I appreciate your letter seeking my intervention in issues surrounding the shipments of nuclear waste from Brookhaven National Laboratory on Long Island, New York. I have previously discussed this matter with Secretary Hodel and with Cindy Douglass, the Administrator of the Research and Special Programs Administration, who has kept me apprised of New York City's efforts in support of its application for a non-preemption determination.

You will recall that last July, after extensive discussion, the City and Secretary Hodel agreed that no shipments of spent fuel would be made from Brookhaven before January 1985. With respect to the transportation casks to be used for the shipments, DOE agreed that any shipments during January 1985 would employ a new, larger cask but that if the larger cask is not available by February 1, a smaller cask will be used until the larger cask becomes available. A copy of the letter from Deputy Assistant Secretary of Energy Robert Morgan to Commissioner McGough, outlining that agreement, is enclosed.

I understand that, pursuant to the agreement, the Department of Energy will begin shipments in late January or early February 1985. Although DOT does not have authority to prevent the shipments from being made, we do have the responsibility to make sure that our safety regulations are complied with. I can assure you that given this Department's regulatory framework governing these shipments, and DOE's record of safe operation, the shipments will be conducted in full accord with all measures necessary to preserve public safety.

Department of Transportation regulations require that shipping cask designs must meet the standards of 10 CFR Part 71, or their equivalent. The smaller cask has been approved by the U. S. Nuclear Regulatory Commission and complies with our regulations. DOT will work with DOE to assure that the larger cask, if used, also complies with DOT regulations.

With respect to the non-preemption determination, Cindy Douglass met with New York City officials on November 8, 1984. At that time, New York City had not completed their study supporting their petition for a waiver. Administrator Douglass assured the City that as soon as the completed application was received, the required review process would be handled as expeditiously as possible.

We look forward to receiving the City's application for a non-preemption determination. I assure you that the application will be reviewed and acted upon on a priority basis.

With best wishes.

Sincerely,

Elizabeth

Elizabeth Hanford Dole

Washington, D.C. 20585

JUL 6 1984

Mr. Joseph T. McGough, Jr.
Commissioner
Department of Environmental Protection
Municipal Building
1 Centre Street
New York, New York 10007

Dear Mr. McGough:

As a result of discussions between representatives of New York City and the U.S. Department of Energy (DOE) regarding the transport of spent fuel from the High Flux Beam Reactor (HFBR) at Brookhaven National Laboratory through the City, we have received a letter from Mayor Koch, dated June 18, 1984. The letter characterizes the matter as an issue of vital concern to the health and safety of the residents of the City and advises that a study of the relative safety of alternative modes of transporting radioactive materials from Long Island to the mainland has been commissioned. It further offers to provide a sum of money to DOE to offset a portion of the acquisition costs of additional spent fuel storage racks for the HFBR, thereby allowing the HFBR to continue operation for approximately 6 additional months (until the end of calendar year 1984) by which time it is expected that a larger shipping cask will be available. The utilization of such a cask would substantially reduce the number of shipments required.

It is understood that, if the offer is consummated, DOE intends to resume spent fuel shipments from the HFBR in January 1985 using the larger FH-TA shipping cask. If the larger shipping cask is not available in January 1985, DOE will, after February 1, 1985, make spent fuel shipments from the HFBR using the smaller capacity HFBR casks and, thereafter, will use the larger shipping cask when it becomes available. DOE will not be bound to delay spent fuel shipments pending the conclusion of any studies conducted by or for the City on alternative shipping modes or routes, nor will DOE be bound to accept any recommendations arising from such studies.

Accordingly, DOE accepts the City's offer upon the following additional understandings:

1. The City will pay to DOE the sum of $20,000. The New York City Department of Environmental Protection agrees to submit this proposed payment for approval of the New York City Board of Estimate at the first meeting of the Board following the execution of this agreement. The City agrees to pay the $20,000 within 30 days of approval by the Board of Estimate. Upon completion of all work by DOE on the fuel storage racks and upon receipt of an invoice therefor, the City will pay to DOE an additional amount not to exceed $10,000.

2. All work on the fuel storage racks, including design, specification, fabrication, procurement, installation, and testing, will be performed by DOE; and title to all property will be and remain within DOE. The City will have no right to review or approve any aspect of such work or the operation of the HFBR.

3. The Secretary of Energy reserves the right to resume shipments at any time in the event of emergency conditions or if the offer is not consummated. If emergency shipments are required prior to January 1985, the City will be so notified, and the situation will be fully discussed prior to shipment.

If you agree, please signify your acceptance by executing the endorsement below on the original and one copy of this letter and return the original to this office.

Sincerely,

R L Morgan

Robert L. Morgan
Deputy Assistant Secretary
for Defense Programs

ACCEPTED:

THE CITY OF NEW YORK

NAME: Joseph L. McGlaughlin

TITLE: COMMISSIONER

DATE: July 12, 1984

cc:
Honorable Edward I. Koch

MARIO BIAGGI
19TH DISTRICT, NEW YORK

WASHINGTON OFFICE
2428 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515
(202) 225-2464

DISTRICT OFFICES:
BRONX
3755 [illegible] AVENUE
BRONX, NEW YORK 10461
(212) 931-6100
YONKERS
SECOND FLOOR
6 [illegible] AVENUE
YONKERS, NEW YORK 10704
(914) 375-0000

**Congreſs of the United States**
**House of Representatives**
**Washington, D.C. 20515**

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SUBCOMMITTEE
CHAIRMAN, HUMAN SERVICES
CHAIRMAN, AD HOC
CONGRESSIONAL COMMITTEE
FOR IRISH AFFAIRS

October 26, 1984

The Honorable Elizabeth Hanford Dole
Secretary of Transportation
Department of Transportation
Washington, D.C. 20590

Dear Madam Secretary:

I am writing once again to seek namely, your personal intervention in an important matter of mutual concern--the shipment of nuclear waste by truck from the Brookhaven National Laboratories on Long Island, New York, through New York City and Westchester County (NY).

It has come to my attention that a comprehensive study on alternative methods of transporting the spent fuel will be completed and ready for submission to DOT along with a waiver of preemption application from the City of New York by the end of November 1984. In fact, City officials have informed me that they have arranged for a November 8 meeting with Cynthia Douglas, Administrator of the Research Special Programs Administration, to discuss the study prior to formal submission.

Since the U.S. Department of Energy has scheduled shipment of the nuclear waste to begin no later than February 1985, I would strongly urge you to take whatever action is necessary to ensure that DOT's review of the City's waiver of preemption application be completed prior to the first scheduled shipment of nuclear waste from Brookhaven. If that cannot happen under the current timeframe, I would urge you to contact DOE Secretary Hodel to request that the nuclear waste shipments be delayed until a final DOT decision is reached. I believe a delay is more than justified given a variety of factors, including the increased storage capacity at Brookhaven and the safety concerns surrounding the shipping casks to be used. (I am enclosing my recent letter to Secretary Hodel, which discusses these factors in further detail.) Knowing that you share my interest and concern in this matter of extreme importance I look forward to your response.

Sincerely,

Mario Biaggi

MARIO BIAGGI, M.C.

MB:cf/mm
Enclosure

THIS STATIONERY PRINTED ON PAPER MADE WITH RECYCLED FIBERS

MARIO BIAGGI
19th District, New York

Washington Office
2428 Rayburn House Office Building
Washington, D.C. 20515
(202) 225-2464

District Offices

Bronx
3210 Westchester Avenue
Bronx, New York 10461
(212) 931-0100

Yonkers
Second Floor
5 Seminary Avenue
Yonkers, New York 10704
(914) 375-0900

**Congreſs of the United States**
**House of Representatives**
**Washington, D.C. 20515**

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Subcommittee
CHAIRMAN, HUMAN SERVICES
CHAIRMAN, AD HOC
CONGRESSIONAL COMMITTEE
FOR IRISH AFFAIRS

October 25, 1984

The Honorable Donald Paul Hodel
Secretary of Energy
Department of Energy
Washington, D.C. 20585

Dear Mr. Secretary:

I am writing to urge you to further delay the shipment of nuclear waste by truck from the Brookhaven National Laboratories on Long Island, New York, through New York City and Westchester County (NY).

Specifically, I am deeply concerned about a number of factors related to this shipment, many of which were focused on at an October 15 hearing in New York City, and would urge you to further delay the shipment of the nuclear waste until all of these concerns are satisfactorily addressed. Listed below are the reasons I believe a further delay is justified, and could be accomplished.

1) A comprehensive study on alternative methods of transporting the spent fuel will be completed and ready for submission to the U.S. Department of Transportation, along with a waiver of preemption application from the City of New York by the end of November 1984. Although I have urged DOT Secretary Dole to expedite the review process of this study, it is uncertain at this time whether any final decision on the City's application can be reached before the first scheduled waste shipments.

2) It has come to my attention that the added storage capacity at Brookhaven, which was funded by the City of New York, has not been utilized to date. Thus, it would appear that Brookhaven should have enough storage capacity for at least the next six months.

3) If current storage capacity does create a problem, it would seem that the larger MH-1A casks, which can hold up to 32 elements, could provide whatever additional storage space might be necessary at Brookhaven until all other issues are resolved.

4) Safety concerns regarding the larger MH-1A casks must be addressed. Consider, for example, that these casks have

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Secretary Hodel
October 25, 1984
Page 2

not been approved by the Nuclear Regulatory Commission (NRC), which has stated that these casks should have fire shields to better protect against leakage in the event of a crash, fire, or lead meltdown. DOE has indicated a willingness to add the fire shields and obtain NRC approval of the casks, but this process may prevent the larges casks from being used for the first nuclear waste shipments, resulting in increased risks to New Yorkers, and increased costs to DOE.

5) A $50 million highway safety improvement project is scheduled to begin early next year, with many of the repairs to be made along the proposed shipping route (New England Thruway). I have contacted the New York State Department of Transportation and the New York Thruway Authority to urge that these safety improvements along the shipping route be expedited and completed, if possible, before the waste shipments begin. However, it now appears that none of the highway safety improvements will be done in time if the shipments begin as currently scheduled.

Based on our earlier discussions and the responsible actions DOE has already taken to make the shipping of the nuclear waste as safe as possible, I am hopeful you will agree that by further delaying the shipments and addressing the concerns mentioned in this letter the best interests of the public will be served. Please inform me of your views and any actions taken in this matter of extreme importance.

Sincerely,

Mario Biaggi

MARIO BIAGGI, M.C.

MB:cf/rm

**Department of Energy**
**Washington, D.C. 20585**

JUN 15 1984

Honorable Mario Biaggi
House of Representatives
Washington, D.C. 20515

Dear Mr. Biaggi:

We appreciate your interest in the shipment of spent fuel from the Brookhaven National Laboratory. Your strong involvement in the efforts to resolve this issue in a manner mutually beneficial to New York, the taxpayers, and the Department of Energy are commendable.

The discussions with you, your staff, and Officials of New York City have concentrated on the delay of shipments until a larger cask is available and the city commissioned study on the issue can be completed. The use of a larger cask would require far fewer shipments than the cask currently available. If appropriate agreement can be reached with the city, shipments will be delayed until early next year.

Thank you for your cooperation and assistance in working toward a mutually beneficial solution to this problem. Secretary Hodel will inform you of the final results in the near future.

Sincerely,

Robert L. Morgan
Deputy Assistant Secretary
for Defense Programs

## City of New York v. U. S. Department of Transportation

### BACKGROUND

In 1976 the City of New York amended its Health Code to effectively ban the use of motor vehicles to transport spent fuel from nuclear reactors in Long Island because all roads from Long Island pass through New York City. Spent nuclear fuel was subsequently removed from Long Island by barge across the Long Island Sound to New London, Connecticut.

The Brookhaven National Laboratories, which operates a reactor on Long Island, responded to the City's action by asking DOT to declare the amendment inconsistent with, and thus preempted by, the Hazardous Materials Transportation Act (HMTA).

In an Inconsistency Ruling (IR-1) published in April of 1978, DOT found that the amendment to the City's Health Code was not preempted by the HMTA. The basis for this finding was that, although the HMTA authorized the Secretary of Transportation to develop national rules for the routing of radioactive materials, the Secretary had not yet exercised that authority. Consequently, in DOT's view, municipalities like New York City were free to enact their own routing rules.

### RULEMAKING

As a consequence of the proliferation of State and local restrictions on the transportation of radioactive materials across the country, DOT decided to investigate the need for Federal rules governing highway carriers of radioactive materials. Accordingly, in August of 1978, DOT published an Advance Notice of Proposed Rulemaking. From the outset, DOT indicated that any proposed rulemaking would be limited to highway routing. The reason for this limitation was that the highway mode offered the greatest number of routing possibilities and encountered the greatest number of immediate and significant disparities in State and local safety requirements.

In January of 1980, DOT published a Notice of Proposed Rulemaking which set forth DOT's preliminary assessment of appropriate routing and driver training requirements. One year later, after conducting eight public hearings and reviewing more than 1600 comments, DOT published a Final Rule (known as HM-164) which closely resembled the proposed version.

### ROUTING REQUIREMENTS

Under the provisions of HM-164, vehicles carrying large-quantity shipments of radioactive materials are required to operate over "preferred routes" selected to reduce time in transit, except that an Interstate System bypass or beltway around a city is to be used when available. DOT designated the entire Interstate Highway System as a "preferred route" because of the System's low accident rate and its capacity to reduce transit time. However, because DOT believed that, in many cases, local roads might provide safer, more direct routes for highway carriers and that State authorities were better situated to determine where alternative routes might be preferable, DOT recognized the validity of alternative "preferred routes" designated by State Routing Agencies as offering a level of safety equal to or greater than the Interstate System. DOT, moreover, developed "Guidelines for Selecting Preferred Highway Routes for Shipments of Large Quantity Radioactive Materials."

Accompanying HM-164 was an appendix expressing DOT's opinion on the types of State and local transportation restrictions that would be considered inconsistent. According to the appendix, HM-164 would preempt local regulations, such as the New York City Health Code, that prohibit the highway transport of large-quantity shipments of radioactive materials between any two points without providing an alternate route for the duration of the prohibition.

## REQUEST FOR NON-PREEMPTION DETERMINATION

Throughout the rulemaking process, the City had been a vocal critic of DOT's proposals, repeatedly urging DOT to broaden the scope of its inquiry and to consider barging as an alternative requirement for transporting large-quantity shipments of radioactive materials around urban centers that lack circumferential highways. When DOT failed to incorporate the City's barging suggestion into its Notice of Proposed Rulemaking, the City reiterated its support of barging and requested DOT to accompany the Final Rule with an administrative ruling (known as a non-preemption determination) to the effect that DOT waived preemption of the City's transportation restriction. Because this would have required DOT to issue a ruling on the basis of a regulation not yet issued, the City's application for a non-preemption determination was denied as premature.

Once HM-164 was issued as a Final Rule, the City renewed its application. Under the governing procedural regulations, the party seeking a waiver of preemption must bear the burden of proving that the inconsistent State or local rule: (1) offers an equal or greater level of safety than the Federal requirement; and (2) does not unreasonably burden commerce. Rather than providing the documentation necessary to support its application, the City attempted to shift the burden of proof onto DOT by asserting that DOT had failed to prove that HM-164 offered greater safety than the status quo. As the parties had reached an impasse, on January 15, 1982, fifteen days before HM-164 went effect, DOT notified the City that the non-preemption application would most likely be disapproved for lack of substantial supporting documentation.

Preemption of the City's regulation, however, was prevented by order of the U.S. District Court.

## DISTRICT COURT INJUNCTION OF HM-164

Shortly after publication of HM-164 as a Final Rule, the City filed a complaint in the U.S. District Court for the Southern District of New York seeking to invalidate HM-164 on numerous grounds. On January 29, 1982, two weeks after the City was notified that its non-preemption application was likely to be disapproved and three days before HM-164 went into effect, the District Court issued a temporary order restraining the preemptive effect of HM-164 on the City's regulation.

On February 19, 1982, the District Court, in an exhaustive opinion, ruled that HM-164 violated both the HMTA and the National Environmental Policy Act (NEPA) in its preemption of State and local bans on the transportation of large-quantity radioactive materials along highways in densely populated areas. The District Court permanently enjoined the enforcement nationwide of what it concluded to be the invalid effect of HM-164.

The Court then offered the parties the opportunity to suggest corrections to the opinion. Based on these suggestions, the District Court filed an amended opinion and judgment on May 6, 1982, which limited its earlier decision by holding HM-164 to be invalid only insofar as it preempted New York City's Health Code.

## CIRCUIT COURT REVERSAL ON APPEAL

DOT filed an appeal in the U.S. Court of Appeals for the Second Circuit and oral arguments were presented on February 14, 1983. On August 10, 1983, the Circuit Court reversed the judgment of the District Court and remanded the case with instructions to enter a judgment upholding the validity of HM-164. A brief outline of the District Court's findings and the basis for the Circuit Court's reversal on each of the issues is presented below.

1. Compliance with the HMTA

The District Court construed the HMTA to require:

a. That regulations promulgated thereunder must set the safest feasible standards for transportation of hazardous materials;

b. that the regulations must maximize public safety not only for the Nation as a whole but for every local jurisdiction as well; and,

c. that DOT must require shippers to use the safest of alternative modes of transportation.

On the basis of this interpretation, the District Court faulted DOT for failing to demonstrate that HM-164 offers a safer means of transporting radioactive materials than barging these materials around the city.

The Circuit Court rejected this construction of the HMTA, agreeing instead with DOT's interpretation:

a. Since the declared policy of the HMTA is "to protect the Nation adequately against the risks" inherent in hazardous materials transportation, the HMTA does not require the Secretary to maximize safety. Rather, it authorizes her to set acceptable levels of safety.

b. If Congress had intended to require the Secretary to adopt only those HMTA regulations that would maximize safety on a jurisdiction by-jurisdiction basis, there would have been no reason to include a non-preemption procedure to permit safer local regulations.

c. Although the HMTA consolidated Federal regulatory controls over the various modes, none of the Act's provisions remotely suggests a Congressional intent to mandate comparisons among modes of transportation.

Having rejected the District Court's construction of the HMTA, the Circuit Court considered the question of what standards the HMTA sets to govern the Secretary's rulemaking authority. It found that "HMTA regulations are valid as long as they are rationally related to the policy - the development of acceptable levels of public safety for each mode of transportation - underlying HMTA and are promulgated with the Administrative Procedures Act." The Circuit Court found that "DOT fully complied with these standards."

### 2. Considerations of Alternatives under NEPA

The District Court held that DOT had violated NEPA by failing to give sufficient consideration to barging as a possible alternative to the proposed agency action.

The Circuit Court rejected this interpretation of the NEPA requirements, pointing out that DOT had acted within its statutory mandate to limit its inquiries to a single mode of transportation. Moreover, the existence of the non-preemption process enables DOT to give adequate consideration to barging or other alternative transportation modes in those areas where local circumstances warrant. Finally, the Circuit Court pointed out that requiring DOT to make site-specific considerations of modal choice would make it virtually impossible for the agency to promulgate national standards.

### 3. Consideration of "Significant Effect" under NEPA

The District Court held that DOT had violated NEPA by determining in its Environmental Assessment (EA) that HM-164 did not require preparation of an Environmental Impact Statement (EIS) because it was not an action that would significantly affect the environment. The District Court did not rule that an EIS was required. Rather, it concluded that the EA was flawed in its consideration of whether HM-164 would significantly affect the environment and thus require the preparation of an EIS. The EA was criticized on three grounds (1) DOT had insufficiently analyzed the probability of a high-consequence accident; (2) DOT had not fully discussed the consequences of such an accident; and (3) DOT had impermissibly considered the risk of a worst-case accident insignificant simply because the chances of such an accident are extremely low.

The Circuit Court considered this to be the "core issue" of the case and took great pains to review the EA in light of the District Court's criticisms:

> At this level of technical detail within a national rule-making process, errors in computation o shortcomings in analysis would have to be extraordinaril grievous to justify the District Court's conclusion that the rrors and ommissions render the agency's overall assessment rbitrary and capricious. Examining separately the District Court's critique of DOT's assessment of probabilities, consequences, and overall risk of high-consequence accidents, we see no egal infirmity in DOT's conclusions.

After dispensing with the District Court's criticism of the technical components of the EA, the Circuit Cout dealt with its overall dissatisfaction with DOT's use of the results of the assessment of overall risk. As to the District Court's ericism of the risk analysis technique employed by DOT, the Circuit Cort held, on the basis of its review of the EA, that "a district court is precluded from imposing its own choice of risk analysis upon a federa agency. As long as the agency's choice of methodology is justifiable in light of current scientific thought, a reviewing court must accpt that choice."

As to the District Court's conclusion that DOT, having conceded the infinitessimal probability that the rule might lead to catastrophic consequences, was wrong to conclude that it would have no significant impact on the environment, the Circuit Cou held that "this view does not comport with the degree of deference that courts should accord to agency determinations concerning environmental consequences."

In conclusion, the Circuit Court stated that "(t)o a larg extent the proceedings in the District Court can be viewed not as a review of the validity of HM-164 as applied to New York City but as an inquiry into DOT' anticipated denial of the City's request for a non-preemption ruling unde: sectio 112(b) of HMTA. To the extent that this occurred, it was premature." Referring o the Congressional intent in framing the HMTA that federal regulations wod presumptively preempt inconsistent local rules and that local authorities would bear the burden of demonstrating to DOT that their rules provided greate safety without burdening interstate commerce, the Circuit Court held that courts re not free to reverse this presumption or to shift the burden of proof. If DOT ultimately denies the City's pending application for a non-preemption ruling, the City can seek judicial review of the denial. In the interim, however, Congress has legislated that the federal rule will govern.

## APPEAL TO THE SUPREME COURT

Since the Circuit Court decision was announced, (1) the City has filed a Notice of Appeal to the U.S. Supreme Court and (2) the Circuit Court has denied the City's Motion for Stay of Mandate Pending Notice of Appeal to the Supreme Court.

Feb 27, 1984 Supreme Ct dismissed City's appeal

Mr. **Florio**. Thank you very much. It has been presented to me Congressman Gilman has an urgent commitment. We will recognize him.

## STATEMENT OF HON. BENJAMIN A. GILMAN

Mr. **Gilman**. Thank you.

I want to commend the chairman and the subcommittee for convening this hearing at a very critical time regarding the transport of hazardous waste. I might add at the outset, the Little study proposes six alternative routes.

Mr. **Scheuer**. You mean the Arthur D. Little study, not the small study.

Mr. **Gilman**. I thank the gentleman. The Arthur D. Little study proposes that five of those alternate routes go through the heart of my congressional district. I represent the area that has bridges on both sides of the river, and I have Interstate 84 and Interstate 287. So five of these six alternative plans cut right through the heart of our district.

While it may not be as densely populated as the district of the gentleman from New York City, Mr. Biaggi, each and every law is just as important in our area as it is in metropolitan New York. These routes go through the heart of some of our smaller cities. Our county officials are extremely concerned. There has been a great deal of reaction in our area, and I urge the committee, the chairman, and the Department of Energy to take advantage of the 2.5-year period of time we have derived as a result of making room in the Brookhaven warehouses, to conduct a very thorough investigation of this entire problem so that we can find a better, safer way of transporting this hazardous waste.

There is no question we have to transport the waste, but let's do it in the most appropriate manner, the safest manner. I regret I don't have a route to suggest to you as an alternative, but I think we can certainly explore better methods than going through the most heavily traveled expressway and through the heaviest populated areas in our country. I am sure we can find a better way of doing it.

I urge our committee to explore that method. I thank you for permitting me to go ahead. I have been called back to the floor.

Mr. **Florio**. Thank you for your succinct remarks.

[The prepared statement of Mr. Gilman follows:]

### Statement of Hon. Benjamin A. Gilman

I thank the chairman and distinguished members of the subcommittee for allowing me the opportunity to share with you my views and those of my constituents in the 22nd Congressional District of New York, regarding the transportation of hazardous wastes. I know I speak for many when I commend the subcommittee for their fine work and leadership in formulating this Nation's hazardous waste management policy.

We are all aware of the enormity of the problem of transporting hazardous waste safely through our cities and towns. While my interest in the management of nuclear waste dates back close to 2 decades and has included my active involvement in New York City's battle to ban the shipment of all radioactive waste through that city—it is a deeply troubling and frustrating chain of events that brings me before the subcommittee today. I wish to state for the record that the route currently being utilized to transport nuclear rods from Brookhaven National Laboratories to the final destination in Idaho, passes through 3 of the 4 counties I represent.

I have had the good fortune to have been preceded at this hearing by several of my colleagues who collectively, have been able to paint a thorough and accurate history of the hazardous wastes transportation issue as it has evolved in New York State. Understandably none of us is pleased to see shipments of spent nuclear fuel move through our respective districts. I think however, valid questions can and will be raised here today regarding: the integrity of the casks, the interpretation and administration of regulations by the department of transportation pre-empting State and local law with regard to the shipment of nuclear waste, the initial lack of communication between the Department of Energy and concerned members of the New York delegation once the Department decided to resume these shipments, and most importantly perhaps, the viability of a route which passes through one of the most highly-populated regions in the country. Any one of these issues considered in and of itself is a point for deep concern—considered en masse the situation clearly warrants immediate action.

It is my understanding that the Department of Energy recently suspended shipments from Brookhaven to allow for the enlargement of the GE-700 casks. It is also my understanding that the 16 shipments made since January have made room for approximately 2 ½ years of additional storage space at the Brookhaven facility. I propose that the Department of Energy take advantage of this 2 ½ year respite to conduct a study on all aspects of the process and make their recommendations for improvement. In their study the Department should pay particularly close attention to the appropriateness of the current route and re-examine the feasibility of utilizing an alternate route. Clearly the "pressing need" to continue the shipments has been abated and the Department should welcome this opportunity to examine and address the many questions raised by today's hearing.

I know that I speak for the residents of the 22nd District of New York when I thank the chairman and the subcommittee for their time and further consideration, and the representatives from the Department of Energy and the Department of Transportation for their willingness to participate in this discussion.

Thank You.

Mr. **Florio**. I recognize the gentleman from New York, Mr. Weiss.

### STATEMENT OF HON. TED WEISS

Mr. **Weiss**. Thank you, Mr. Chairman.

I want to express my appreciation to you and to the subcommittee for getting involved in what obviously is a very, very difficult problem. We do appreciate it and I express my accommodation to the gentleman from New York and Mr. Biaggi for having taken the lead in focusing attention on what is a serious problem.

I would like to start by taking off on your comments, to suggest that the reason that we are here, and the reason we have a number of problems dealing with nuclear waste and nuclear energy and radioactivity, is because of the general lack of concern originally or initially by both the private sector and Government, of the consequences of where you locate nuclear powerplants, nuclear research reactors, or other nuclear facilities.

When I was serving on the city council in 1976 and the health department of the city of New York came forward to try to block the shipment which Brookhaven had undertaken, they were passing through not only the route the gentleman from New York had described in Nassau and Queens across the Long Island Expressway, they were at that time bringing the shipments across the Queens Borough Bridge at 59th Street into mid-Manhattan, shipping the stuff by truck up Third Avenue or Amsterdam Avenue through the most densely populated sections in the country, if not in the world, and across the George Washington Bridge into New Jersey.

It was then that the Health Department sought regulations to provide protection for the people of New York City. Now, this is not the first instance of Government failing to be concerned with the consequence of its actions. In 1964, when I served on the council, the Nuclear Regulatory Commission had authorized Consolidated Edison to put a very, very powerful electric powerplant in Ravenswood, right across the East River in Queens. Because of public outcry, that was stopped, and when they came before us on a nuclear reactor at Columbia University, they agreed they had changed their regulation, and they would never allow the Ravenswood type of reactor to be put into the heart of that kind of densely populated area.

Right now, in New York, we are going through a public fight over a proposal to place a homeport, if you will, for a nuclear weapon's carrying fleet, the Task Force Iowa, in Staten Island, again, without any real concern for the consequences that may result from nuclear weapons accident. We have been at a number of fronts, the community at large has been trying to fight that kind of callousness or disregard of the consequences of one's actions.

When the Hazardous Material Transportation Act was passed, the original intent of that legislation was, and I quote, "to protect the Nation adequately against the risk to life and property which are inherent in transportation of hazardous material." Yet when the Department of Transportation issued a HMTA rule in early 1982 regulating the transportation of radioactive materials, the results seemed intended to minimize inconvenience to Commerce by streamling transportation routes. Safety became a secondary consideration. And that is really what our concern and argument, what our fight is at this point.

Mr. Biaggi has referred to legislation which I have introduced, H.R. 1164, which would try to restore the original aim of the Hazardous Material Transportation Act. The core of it is to shift the burden of proof from the localities to the Federal Government. DOT would have to demonstrate that in fact the locality was not acting legitimately in trying to provide protection and safeguards for their citizenry.

We think that given the rare situation in New York, and I think Denver was referred to, are unique situations in this country, I don't think you are going to be faced with a proliferation of rules and exceptions which would make a national policy an impossible one. I think that it makes a great deal of sense to shift that burden.

Other sections of the bill would direct the Secretary of Transportation to establish regional training centers to meet the widespread demand for local enforcement and emergency response training. Practicaly none of that exists today. It would direct the Secretary to register hazardous materials shippers, transporters, and container manufacturers. No such program presently exists. And it would finally instruct the Secretary to study the most effective, equitable, and cost-efficient method of imposing a user fee on participants in the registration program, and any funds resulting from the study would help finance those local enforcement of safety regulations and development of emergency response programs.

There has been some numbers mentioned about the possible facilities and the increased number of shipments, and I just want to underscore although the projection or indication is that right now, in 1986, there are expected to be 312 interstate shipments on the highway system, by the year 2004, there will be 8,748. So we really have to start focusing on this problem before we have a national panic over this situation.

Thank you very much.

[The prepared statement of Mr. Weiss follows:]

# HALTING SHIPMENTS OF NUCLEAR WASTE THROUGH THE CITY
## TESTIMONY OF CONGRESSMAN TED WEISS

presented at

HOUSE COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON COMMERCE, TRANSPORTATION, AND TOURISM
THE HON. JAMES J. FLORIO, CHAIRMAN

August 1, 1985

Mr. Chairman and Members of Subcommittee, I want to thank you for this opportunity to address the critical issue of nuclear waste shipments through New York City. I applaud the subcommittee's timely effort to examine the problems associated with Department of Transportation policy in this area.

My involvement with efforts to regulate shipments of radioactive materials through densely-populated areas dates back to my tenure as chairman of the New York City Council's Committee on Environmental Protection. I was instrumental in encouraging the New York City Health Department to adopt a ban on shipments of large quantities of radioactive materials without a special city permit. It was at that time -- in the mid-1970s -- that the Department of Energy had begun shipping spent nuclear fuel from Brookhaven Laboratories on Long Island through the city.

My interest, particularly in the area of federal preemption of non-federal transportation laws, remains high in my role as chairman of the Government Operations Subcommittee on Intergovernmental Relations and Human Resources. In recent years we have witnessed growing conflict in relations between federal agencies and state and local authorities over federal attempts to attain uniformity in our nation's laws. Uniformity is indeed desirable in many instances. But often, as in the case of New York City, there are unique circumstances. Federal laws and regulations should reflect sensitivity to valid local concerns.

Two bills which I introduced in the House of Representatives in 1981 sought to preserve the right of New York City to block these shipments. One measure would have rejected a Department of Transportion (DOT) rulemaking -- known by its docket designation, HM-164 -- designed to overturn state and local regulations which do not conform with federal law. The other would have prohibited the transportation of radioactive cargo through urban areas. The latter bill served as the foundation for legislation reported by the Public Works Committee in the 97th Congress; the substitute amendment offered and passed on the House floor was never taken up by the Senate.

A major target of that DOT rulemaking, HM-164, was the portion of New York City's Health Code that banned radioactive shipments. DOT promptly moved to preempt New York's regulations even though they provided a greater level of safety to the public than any applicable state or federal statute.

Many of you know how events subsequently unfolded. New York City challenged HM-164 in court, and after several appeals brought the case to the U.S. Supreme Court. Unfortunately, the Supreme Court declined to consider the case early last year.

In search of a legislative remedy, I authored legislation a year ago which attempts to restore the city's right to prevent radioactive shipments. The bill, a package of amendments to the Hazardous Materials Transportation Act, would also provide state and local governments with resources to help meet their enforcement and emergency response responsibilities.

The cornerstone of the bill is language making it more difficult for the federal government to arbitrarily overturn New York's regulations. The original intent of the Hazardous Materials Transportation Act, "to protect the nation adequately against the risks to life and property inherent in the transportation of hazardous materials in commerce," would be restored.

Other sections of the bill would:

(1) Direct the Secretary of Transportation to establish regional training centers to meet the widespread demand for local enforcement and emergency response training.

(2) Direct the Secretary to register hazardous materials shippers, transporters, and container manufacturers. No such program presently exists.

(3) Instruct the Secretary to study the most effective, equitable, and cost efficient method of imposing a user fee on participants in the registration program. Any fund resulting from this study would help finance those local enforcement of safety regulations and development of emergency response programs.

Earlier this year, joined by my colleagues, Representatives James Scheuer, Mario Biaggi, Thomas Manton and Gary Ackerman, I reintroduced this legislation in the House of Representatives. H.R. 1146 presently has more than 25 cosponsors.

The need for strong local regulation of hazardous materials transportation has never been more clear.

Recent events, such as the Pershing missile explosion killing three U.S. Army soldiers in West Germany, the chemical leak in India, and the liquefied natural gas explosion in Mexico City, serve as stark reminders that statistically-rare catastrophic accidents tend to occur with some regularity.

A 1980 study by Sandia Laboratories concluded that a "worst case" scenario involving a plutonium transportation accident in New York City could result in 1,800 latent cancer fatalities, 290 early morbidities, five early fatalities, and $9 billion in economic damage.

An Environmental Policy Institute study estimated that annual shipments of radioactive materials on the nation's interstate highway system will increase from 312 in 1986 to 8,748 in the year 2004.

Yet, the federal government's attitude has not changed since 1976.

In the aftermath of the Supreme Court's decision, the city applied to DOT for a waiver from federal preemption of its transportation ban. This process included preparation of a comparative risk analysis, which concluded that shipping or barging radioactive materials around the city would reduce risks to our health and safety.

Meanwhile, the Department of Energy announced it intended to renew shipments of radioactive materials. I joined Congressman Scheuer and several other of our New York colleagues in requesting that DOE postpone any shipments until DOT has ruled on the city's preemption waiver.

DOE turned a deaf ear and on January 22 began a new round of shipments when it secretly trucked spent nuclear fuel rods through Queens and the Bronx en route to Idaho. Subsequent appeals to stop the shipments have failed.

This behavior is clearly counter to Congress' intent in enacting the Hazardous Materials Transportation Act. DOT's actions seem determined to to minimize the inconvenience to commerce by streamlining transportation routes -- even if safety becomes a secondary consideration.

This inflexible interpretation of HMTA pays little attention to the delicate balance between federal, state and local regulatory responsibilities I believe Congress intended to establish. In the case of New York, they have preempted stringent local rules governing the transport of radioactive, flammable, explosive and combustible materials into and through our most densely-populated area. In their place, DOT offers weak guidelines for routing. No consideration is given to reasonable alternatives to highway transportation; no special dispensation is awarded to non-federal rules providing greater protection to the public without unreasonably burdening commerce.

I recognize that the uncontrolled proliferation of state and local regulations would be detrimental to commerce, and that we must be aware of the effect that local rules have on neighboring jurisdictions. But DOT's heavy-handed approach to the problem, with its sacrifice of the safety priority embodied in HMTA, is destined to fail.

Since coming to office, the Reagan Administration has zealously advocated a reduction of the Federal government's role in favor of increasing state and local jurisdiction. Yet when the issue is hazardous materials transportation, the Administration has aggressively sought a stronger federal role.

I urge the subcommittee to defend the right of state and local officials to protect the health and well-being of our citizens.

Thank you.

Mr. **Florio**. I recognize the gentleman from New York, Mr. Green.

## STATEMENT OF HON. BILL GREEN

Mr. **Green**. Let me start with a couple of propositions. First, very few parts of the country are going to want high-level radioactive waste materials coming near them if they can avoid it.

Second, despite that, we simply cannot allow a state government, or a local government, or any combination of them, to shut down a facility like the Brookhaven Laboratory, one of our major national laboratories. At the same time it is my feeling that the present regulatory scheme is seriously flowed, and I think that is really what we are addressing here today, that is, how to deal with this thing in a regulatory way.

I don't anticipate that a congressional subcommittee is going to try to decide all the routes over the United States, so we are really looking at the process issue. How should the regulatory system deal in a fair way with this situation? To that end, I have introduced H.R. 2938, the Radioactive Materials Transportation Protection Act of 1985. This is actually a reintroduction of legislation which Senator Specter and I introduced in the last Congress. The essential mechanism of the legislation is to require the production of an environmental impact statement in any case where it is proposed that transportation of these wastes are to be transported through any metropolitan statistical area, that being the threshold the legislation uses to determine the high density areas which, by reason of their population density, would face greater risks if some accident should occur.

I know the argument is made that the possibility of an accident or some other type of danger to the public from this transportation is extremely low, and I don't quarrel with that. But we have learned through a wide variety of recent events, like Three Mile Island and the renaissance of the Chicago Cubs, that sometimes unusual events do occur. Basically, what we need is a process which will really force the Federal Government to do the kind of homework that is needed before deciding what is the best and safest way to provide this transportation.

I think that mechanism is in place in the form of the environmental impact statement process, which requires an assessment of benefits and risks. It is precisely the kind of mechanism we are looking for here, and ultimately provides an opportunity for judicial review if affected jurisdictions feel the process has not been done in a sound way.

Mr. **Florio**. Hasn't a recent court of appeals case decided this is not the kind of action that warrants an environmental impact study?

Mr. **Green**. That is an accurate statement of the law. Therefore, meeting the particular threshold in this legislation would have to go through this process. However, I am seeking to change the law. This legislation does produce a fair balance between the needs for these kinds of facilities, ones like Brookhaven, which are very important to the Nation's future, and the needs of the local populations through which it is proposed to truck wastes or otherwise to ship the waste, to have all elements of the risks inherent in transporting this material considered before a final decision is made.

[The prepared statement of Mr. Green follows:]

## CONGRESSMAN BILL GREEN

## TRANSPORTATION OF NUCLEAR WASTE

## SUBCOMMITTEE ON COMMERCE, TRANSPORTATION AND TOURISM

## AUGUST 1, 1985

Mr. Chairman:

I want to thank you and the Ranking Minority Member of the Subcommittee, Mr. Lent, for holding this hearing today concerning the transportation of nuclear waste. I am pleased to be on the same panel as other Members of Congress from New York and Connecticut. We have a common border and we share much concern about this issue.

On July 9, 1985, I introduced H.R. 2938, the Radioactive Materials Transportation Protection Act of 1985. This legislation is designed to protect better those areas through which high-level nuclear waste is transported by including the local citizenry in the process through which transportation routes are determined.

The transportation of nuclear waste is a complex, important, and controversial subject. As the Representative from Manhattan's East Side, I take a personal interest in this matter. It was not too long ago that the laboratories at Brookhaven, on Long Island, shipped its high-level waste through my District-- right up Third Avenue and over the George Washington Bridge. Although the route has been changed recently, the issue of transporting high-level nuclear waste materials through urban centers demands close attention from this Congress. It is for these reasons that I introduced H.R. 2938 and that I urge my colleagues to press for its adoption.

On February 27, 1984, the U.S. Supreme Court refused to hear New York City's challenge to the U.S. Department of Transportation (D.O.T.) regulation which would require the City to open its highways to trucks carrying nuclear waste. New York banned the transportation of such wastes on its major arteries in 1976 because the federal government did not adequately assess the risks of carrying such wastes through urban centers.

New York City has filed a non preemption determination request with D.O.T., but the Department has yet to act on the proposal. The Department of Energy agreed last year to a voluntary six-month moratorium on radioactive shipments, but it expired on December 31, 1984. At this point, twelve to fifteen shipments have been made through New York, although no part of the current route is in my Congressional District.

Ironically, D.O.T. adopted its regulations without preparing an environmental impact statement, which is required by law for all federal projects which are expected to have a significant impact on the environment. Yet, the shipments occur in the middle of the most densely populated city in our nation. The New York Bureau of Radiation Control has estimated that a small release of high-level waste would cause thousands of deaths, both immediately and as a result of latent exposure. Combined with the Environmental Policy Institute's estimate that over 8,500 shipments of radioactive waste using the interstate highway system will occur annually by the first few years of the 21st century, it is clear that routes which offer the fewest possible chances of danger should be used.

Mr. Chairman, how can we identify the routes with the fewest possible chances of danger without an environmental impact statement-- the same type of study which D.O.T. did not perform before finalizing its routes? We can't. In making its ruling, D.O.T. relied upon statements from statisticians and technicians who argue that there is a low probability of an accident or some other type of danger to the public. I do not question these findings. However, we have learned through a wide variety of recent events, such as Three Mile Island and the renaissance of the Chicago Cubs, that predictions are only educated guesses. Given the density of our major population centers, it is only reasonable for residents of a city to ask that the transportation of nuclear waste be restricted.

My legislation recognizes that highway accidents involving vehicles transporting dangerous radioactive waste materials through populated areas could have significant effects on the environment and on public safety. It is also the case that the possible consequences are extraordinarily harmful and could include many deaths, large numbers of injuries, and billions of dollars in property damage.

Therefore, H.R. 2938 requires that the Secretary of Transportation file an environmental impact statement under Section 102 of the National Environmental Policy Act (NEPA; 42 U.S.C. 4332) in the process of determining the route of travel for any shipment of a controlled quantity of radioactive materials into or through a high-density metropolitan area. In addition, that environmental impact statement must include the consideration of alternative modes of transportation, such as barges for water routes. This proposal would apply to any route determination made under the regulations promulgated by D.O.T., and my legislation defines "high-density metropolitan area" as a metropolitan statistical area-- areas comprising the sixteen percent of the United States which is most densely populated and, therefore, has the potential to suffer the most damage.

When I testified in 1984 before the Subcommittee on Surface Transportation of the Committee on Public Works and Transportation on behalf of similar legislation I proposed last year, I was asked if my legislation would not have the effect of pitting rural residents against city-dwellers. I replied by saying that the federal government's nuclear energy policy has been clear in its attempt to locate nuclear power plants and study facilities as far away as possible from population centers in order to avoid as much risk as possible. Given that this policy has been successful, it only makes sense that the transportation of nuclear waste should follow the same guidelines, i.e., that the harmful byproducts of nuclear energy be transported in such a way as to avoid risk.

Unlike some proposals, my legislation does not forbid the transportation of high-level nuclear waste through cities and towns, per se. Waste does exist, and it must be transported to storage and burial sites. However, the successful completion of an environmental impact statement, as required by H.R. 2938, would allow for community participation in this important decision-making process. I believe that the results of an environmental impact statement would prove conclusively that the current routing system is fundamentally flawed and, just as important, that sound alternatives exist. My legislation is a reasonable and just attempt at statutory language which would both alleviate the fears of urban residents and satisfy the needs of the Departments of Transportation and Energy in ensuring the timely and satisfactory transportation of nuclear waste. I urge my colleagues to move for its early adoption.

Mr. FLORIO. Let me express the thanks of the committee for the members' testimony and say their concerns related to this committee and particularly this chairman, not just here but in the course of private conversations, are appreciated—Mr. Biaggi has been particularly forceful in pointing out the dilemma we are currently facing. I appreciate that.

Let me yield at this point.

Mr. LENT. I have just one question for my colleague, Mr. Green. Your bill requires the Secretary of Transportation to file an environmental impact statement in the process of determining the route of travel. I think it also provides they have to discuss the various modes of travel, barge——

Mr. GREEN. Yes. Like any environmental impact statement, they have to show what the alternatives are.

Mr. LENT. How often would such a statement have to be prepared? Would it have to be prepared for every shipment?

Mr. GREEN. No, for each determination of a route, and only in the case where the route involves passage through a metropolitan statistical area.

Mr. LENT. Suppose we had detours and had to change the route.

Mr. GREEN. Any time there was a requirement to change the route, there would have to be an environmental impact statement.

Mr. LENT. I have no further questions.

Mr. FLORIO. Any further questions?

Mr. SCHEUER. Except that we have checked the Arthur D. Little report, and it does, as part of its calculus for computing risk-benefit, it does take into account the risk-benefit factors in barge transportation, water transportation, and loading and carrying and unloading, as part of the overall calculus. I have checked that since we have discussed that a one-half hour or more ago. And it is a proper and professional risk and benefit analysis, which it couldn't be if it didn't take into account all of the risk-benefit factors from inception to completion of that journey.

Mr. GREEN. From my recollection, having read it, the gentleman is absolutely correct.

Mr. FLORIO. Let me thank the witnesses.

We will move on to our adminstration representatives, who comprise the very important panel we have now. Thank you very much for your participation.

Mr. FLORIO. We are pleased to have Mr. George Tenley, Acting Chief Counsel of the Research and Special Programs Administration, Department of Transportation; and Mr. William W. Hoover, Assistant Secretary for Defense Programs, Department of Energy.

Gentlemen, we welcome you to our committee. Your statements will be put into the record in their entirety. You may proceed as you see fit.

Mr. Tenley, we would ask you to testify first.

## STATEMENTS OF GEORGE TENLEY, ACTING CHIEF COUNSEL OF THE RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION, DEPARTMENT OF TRANSPORTATION; AND WILLIAM W. HOOVER, ASSISTANT SECRETARY FOR DEFENSE PROGRAMS, DEPARTMENT OF ENERGY

Mr. TENLEY. Thank you, Mr. Chairman.

I appreciate the opportunity to appear——

Mr. FLORIO. We would ask our guests be quiet.

Mr. TENLEY. I appreciate the opportunity to appear before the subcommittee today to discuss an issue which has occupied a substantial amount of my time and interest over the last 8 years. The transportation of radioactive material, particularly spent nuclear fuel, is an issue that grows daily as more nuclear powerplants go on line, more spent fuel is shipped for reprocessing or storage, and as the public's concern over all phases of nuclear safety increases.

In the testimony that I have submitted for the record, I have provided a rather detailed discussion of perhaps the most important aspect of transportation safety—at least the aspect which seems to command the most attention—the routing of spent nuclear fuel. I will not add to that discussion in these remarks, but I would like to mention briefly the Department's view of how best to discharge the important responsibilities assigned to it, primarily by the Hazardous Materials Transportation Act.

We believe that the act, in conjunction with the regulations adopted under it, in this case HM-164, provides a sound framework for assuring a routing scheme that is safe and that makes possible interstate commerce in spent fuel. Although Congress expressed its belief that a strong Federal presence was necessary in the realm of hazardous materials transportation, and that the Department of Transportation should have broad regulatory and enforcement powers to make that presence effective, Congress also recognized that States and local jurisdictions had a necessary role to play. The inclusion of HM-164 of the States' role in alternate route designation is a clear indication of our belief that the States can and should be active in determining safe routes.

The Hazardous Materials Transportation Act assigns to the Department the reconciliation of State and local requirements with their Federal counterparts. We historiclaly have performed that role through our administrative proceedings for determining inconsistency and waivers of preemption. However, we have seen increasingly that it is incumbent upon the Department to pursue the compatibility of all aspects of the Nation's regulatory framework through cooperative efforts that do not involved adversarial proceedings.

Under the leadership of Secretary Dole and at the direction of Administrator Douglass, we have taken steps to increase our cooperative efforts. In fact, Administrator Douglass' absence today is due to her involvement in a 3-day seminar in Chicago that is examining issues involved in spent fuel transportation. With representation from 49 States and 10 tribal nations, the seminar will provide an effective forum for educating key State personnel on HM-164 and the Federal program, but perhaps, more importantly, it will provide for an exchange of views among the States.

Hopefully such an exchange will increase the willingness and ability of States to work among themselves in exercising the important role they can play in route designation. We know that when States work together, routing is greatly enhanced. An example of this can be seen in the designation by Delaware, Maryland, and Virginia of Route 301 as an acceptable alternative route to Interstate 95.

Taking the concept of this seminar one step further, Administrator Douglass has stated that she would like to arrange for regional seminars to narrow the issues within various sections of the country and to provide greater exposure to the views of local jurisdictions.

It is important to note that the seminar is an example of our close working relationship with the Nuclear Regulatory Commission. Operating in conjunctin with one another under a memorandum of understanding, the two agencies have brought their expertise to bear on the transportation of spent nuclear fuel through the interrelationship of our regulations, our joint compliance efforts, and our day-to-day consultation at the staff level.

Finally, I would like to note one additional measure that we have recently taken that we believe will enhance our ability to work with State and local governments. As part of the recently announced reorganization within the Research and Special Programs Administration, all hazardous materials functions have been united in one office reporting directly to the Administrator. Within that office, we have established a unit that will be dedicated to cooperative and educational initiatives designed to give State and local jurisdictions a single point of contact within the Department for discussion and resolution of concerns without resort to more formal proceedings.

In conclusion, I believe that this hearing is very timely and should serve to heighten the awareness and knowledge of Congress and the public on the issues involved in transporting spent nuclear fuel. Although the safety record of such transportation is unblemished with no deaths or injuries having occurred, neither the relevant Federal agencies nor State and local governments can rest on that record. Fortunately, there is a statutory and regulatory framework that is well suited to meet the issues that are being discussed today.

Thank you very much.

[Testimony resumes on p. 184.]

[Mr. Tenley's prepared statement follows:]

# TESTIMONY OF GEORGE W. TENLEY, JR.
ACTING CHIEF COUNSEL
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION
BEFORE THE SUBCOMMITTEE ON COMMERCE,
TRANSPORTATION AND TOURISM
OF THE HOUSE COMMITTEE ON ENERGY AND COMMERCE

I am pleased to appear before the Subcommittee today to describe the regulatory program of the Department of Transportation (DOT) with respect to the safe transportation of radioactive materials. In that context, I would also like to discuss the relationship between the Federal regulations and those of state and local governments.

As with all other hazardous materials, DOT's responsibility for radioactive materials safety encompasses all aspects of transportation activity. DOT promulgates and enforces safety regulations governing: containers and packagings; hazard warning systems; handling procedures; care of vehicle and lading during transportation; routing; training and qualifications; and incident reporting. DOT also assists state and local governments with technical and other information and guidance for meeting emergencies connected with such transportation activities.

DOT, of course, is not the only Federal agency with responsibilities in this area. The Nuclear Regulatory Commission, the Department of Energy, the Federal Emergency Management Agency, the Department of Health and Human Services and the Occupational Safety and Health Administration each have responsibilities with regard to nuclear safety. DOT works closely with each of these agencies.

I would like to point out that the safety record for radioactive materials transportation is excellent. No deaths, injuries, or significant spills have occurred during the 15 years for which RSPA has kept incident records.

Having noted that DOT's regulatory programs address a wide variety of safety issues posed by the transportation of radioactive materials, I would like to focus my remarks on that area which I understand is of primary interest to the Subcommittee: the highway routing of radioactive materials, especially spent nuclear fuel.

## INTRODUCTION

In January of 1981, DOT issued a final rule on highway routing of radioactive materials (Ref. 1), which is commonly referred to by its docket number, HM-164. The principal purpose of HM-164 was to establish nationally applicable standards for the safe highway routing of radioactive materials. My testimony today will review the legal history of HM-164, describe its substantive provisions, and discuss its impacts on certain state and local rules.

## GENERAL AUTHORITY AND PREEMPTION UNDER THE HMTA

DOT's authority to regulate hazardous materials transportation safety is derived from the Hazardous Materials Transportation Act (HMTA) (Ref. 2). The HMTA authorizes the Secretary of Transportation to designate certain materials as hazardous and to issue and enforce safety regulations governing the transportation and handling of such materials. Section 105 of the HMTA (49 U.S.C. 1806) specifically includes routing among the types of regulations which the Secretary is authorized to issue.

Substantive regulations issued under the HMTA are known as the Hazardous Materials Regulations (HMR) and are codified as Parts 170-179 of Title 49 of the Code of Federal Regulations. Procedural regulations are codified at 49 CFR Parts

106-107. Within DOT, the primary responsibility for issuance and interpretation of the HMR has been delegated to the Research and Special Programs Administration (RSPA).

The HMTA expressly defines its relationship to state and local law. Section 112(a) states clearly that "any requirement, of a State or political subdivision thereof, which is inconsistent with any requirement set forth in (the HMTA) or regulations issued under (the HMTA), is preempted." The inclusion of this express preemption provision makes it clear that Congress did not intend the HMTA and its regulations to occupy the field so completely as to preclude any state or local action. The HMTA preempts only those state and local requirements that are "inconsistent." The legislative history of this provision indicates that Congress intended it "to preclude a multiplicity of State and local regulations and the potential for varying as well as conflicting regulations in the area of hazardous materials transportation." (Ref. 3) The Safety concerns addressed in this policy statement are twofold: first, that the Federal government is responsible for assuring the safe transportation of hazardous materials in commerce; and, second, that a multiplicity of non-uniform state and local rules can create confusion among those to whom the rules are meant to apply, confusion which results in reduced compliance and increased risks.

Under Section 112(b) of the HMTA, the Secretary of Transportation may waive preemption of an inconsistent state or local requirement upon a showing by the particular jurisidiction that the requirement offers an equal or greater level of safety and does not unreasonably burden commerce. The inclusion of this waiver provision reflects the Congressional recognition that "certain exceptional circumstances may necessitate immediate action to secure more stringent regulations." (Ref. 4)

Title 49 CFR Part 107, contains procedures which implement the preemption language of the HMTA by providing for the issuance of inconsistency rulings. At the time that these procedures were published, we noted that "(t)he determination as to whether a State or local requirement is consistent or inconsistent with the Federal statute or Federal regulations is traditionally judicial in nature." (Ref. 5) There are two principal reasons for providing an administrative forum for such a determination. First, an inconsistency ruling provides an alternative to litigation for a determination of the relationship between Federal requirements and those of a state or political subdivision thereof. Second, if a state or political subdivison requirement is found to be inconsistent, such a finding provides the basis for application to the Secretary of Transportation for a determination as to whether preemption will be waived.

Since such proceedings are conducted pursuant to the HMTA, only the question of statutory preemption can be considered. A Federal court may find a non-Federal requirement not statutorily preempted, but, nonetheless, preempted by the Commerce Clause of the U.S. Constitution because of an undue burden on interstate commerce. However, the Department of Transportation does not make such determinations in the context of its inconsistency rulings.

Given the judicial character of the inconsistency ruling proceeding, we have incorporated into it case law criteria (Ref. 6) for determining inconsistency:

(1) Whether compliance with both the (non-Federal) requirement and the Act or the regulations issued under the Act is possible; and

(2) The extent to which the (non-Federal) requirement is an obstacle to the accomplishment and execution of the Act and the regulations issued under the Act. (49 CFR 107.209(c))

The first criterion, commonly called the "dual compliance" test, concerns those non-Federal requirements which are incongruous with Federal requirements; that is, compliance with the non-Federal requirement causes the Federal requirement to be violated, or vice versa. The second criterion, the "obstacle" test, in a sense, subsumes the first and concerns those Federal rules that, regardless of conflict with a Federal requirement, stand as "an obstacle to the accomplishment and execution of the (HMTA) and the regulations issued under the (HMTA)." In determining whether a non-Federal requirement presents such an obstacle, it is necessary to look at the full purposes and objectives of Congress in enacting the HMTA and the manner and extent to which those purposes and objectives have been carried out through the Department's regulatory program.

The standards by which the Secretary of Transportation determines whether to waive preemption are set forth in the HMTA. Section 112(b) authorizes waiver of preemption of an inconsistent non-Federal requirement upon finding that such requirement:

(1) affords an equal or greater level of protection to the public than is afforded by the requirements of (the HMTA) or or regulations issued under (the HMTA) and

(2) does not unreasonably burden commerce. (49 U.S.C. 1811(b))

The foregoing discussion of DOT's regulatory authority, while somewhat lengthy, provides the background necessary for an understanding of the development of both the substantive provisions of HM-164 and the appendix thereto.

## DEVELOPMENT OF THE RULE

In 1976 the City of New York amended its Health Code in such a way as to effectively prohibit the transportation of most commercial shipments of radioactive materials in or through the City. Because all roads from Long Island pass through New York City, the amendment amounted to a ban on the use of motor vehicles for transporting spent nuclear fuel from nuclear reactors in Long Island. Brookhaven National Laboratory, which operates a research reactor on Long Island, responded to the City's action by petitioning DOT for an administrative ruling declaring the amendment to be inconsistent with, and thus preempted by, the HMTA.

In an Inconsistency Ruling published in April of 1978 (Ref. 7), DOT found that the amendment to the City's Health Code was not preempted by the HMTA. The basis for this finding was that, although the HMTA authorized the Secretary of Transportation to develop national standards for the routing of radioactive materials, the Secretary had not yet initiated any exercise of that authority. Consequently, in DOT's view, municipalities like New York City were free to enact their own routing rules until such time as DOT took action on the matter.

Recognizing the implications of its ruling for the already growing number of State and local restrictions on nuclear transportation, DOT decided to investigate the need for Federal rules governing highway carriers of radioactive materials. Accordingly, in August of 1978, DOT published an Advance Notice of Proposed Rulemaking (Ref. 8), opening Docket No. HM-164 and asking for public comment to assist in deciding whether rules governing highway routing of radioactive materials should be developed and proposed and, if so, what the rules should say. From the outset, DOT indicated that any proposed rulemaking would be limited to highway routing. The reason for this limitation was that the highway mode offered the greatest number of routing possibilities and encountered the greatest number of immediate and significant disparities in state and local safety requirements. More than 550 comments were received in response to the Advance Notice.

In January of 1980, having analyzed all the comments and thoroughly researched the subject, DOT published a Notice of Proposed Rulemaking (Ref. 9) which set forth DOT's preliminary assessment of appropriate routing and driver training requirements. One year later, after conducting eight (8) public hearings and reviewing more than 1600 comments on the proposed rule, DOT published HM-164 as a Final Rule. As adopted, HM-164 closely resembled the proposed version.

## PROVISIONS OF HM-164

The preamble to HM-164 stated DOT's conclusion that, on the basis of the extensive public comment on the docket, documented risk studies and past experience for radioactive material transport, the public risks in transporting these materials by highway were too low to justify the unilateral imposition by local governments of bans and other severe restrictions on the highway mode of transportation. Moreover, other modes of transport were generally found not to offer alternatives which lowered public risks to such an extent as to warrant substantial restriction of the highway mode. However, DOT also found that these already low risks could be further reduced by the adoption of driver training requirements and provisions for a method of selecting the safest available highway routes for carriers of large quantity radioactive materials. On this basis, DOT adopted the final rule whose provisions are described below.

General Routing Rule

The general routing rule applicable to highway shipments of radioactive materials which must be placarded is codified at 49 CFR 177.825(a). It applies to thousands of shipments involving relatively low-hazard radiopharmaceuticals and other medical and industrial isotopes. Their transportation frequently involves multiple pickups and deliveries, interchanges with other modes of transport, and commingling with non-hazardous materials on the same vehicle.

The general routing rule states:

> (a) The carrier shall ensure that any motor vehicle which contains a radioactive material for which placarding is required is operated on routes that minimize radiological risk Thecarrier shall consider available information on accident rates,transmit time, population density and activities, time of day and day of week during which transportation will occur. In performance of this requirement the carrier shall tell the driver that the motor vehicle contains radioactive

> materials and shall indicate the general route to be taken. This requirement does not apply when—
>
> (1) There is only one practicable highway route available, considering operating necessity and safety, or
>
> (2) The motor vehicle is operated on a preferred highway under conditions described in paragraph (b) of this section.

The basic objective of the rule is that the carrier examine all available highway routes and select one which minimizes radiological risk to the public. In making this determination, the carrier must consider available information on the most important factors which contribute to the minimization of radiological risk. The rule identifies these factors as population, accident rates of available highways, transit time, and the time of day and day of week during which the shipment occurs.

Routing of Large Quantity/Highway Route Controlled Quantity Shipments

While the general routing rule described above engendered a great deal of public comment, the most controversial feature of HM-164 was its establishment of specific routing requirements for "large quantity radioactive material." The definition of this term was set forth in the HMR at §173.389(b). However, in a subsequent rulemaking action (Ref. 10) which became effective July 1, 1983, the term "large quantity radioactive material" was deleted from the HMR and the term "highway route controlled quantity radioactive material" was adopted in its place. The definiton of the new term is codified at 49 CFR 173.403(l). The revision was necessary to ensure the compatibility of the HMR with the latest revised international standards for transport of radioactive materials. While there are some differences between the values for "large quantity" and "highway route controlled quantity" radioactive material, the differences do not materially affect the implementation of HM-164. Therefore, this paper will discuss the provisions of HM-164 as amended to include the new terminology.

Under HM-164, specific routing requirements were established for highway shipments of highway route controlled quantity radioactive material (such as spent nuclear fuel). These requirements are codified at 49 CFR 177.825(b):

> (b) Unless otherwise permitted by this section, a carrier and any person who operates a motor vehicle containing a package of highway route controlled quantity radioactive materials as defined in §173.403(1) of this subchapter shall ensure that the vehicle operates over preferred routes selected to reduce time in transit, except that an Interstate System bypass or beltway around a city shall be used when available.
>
> (1) A preferred route consists of-
>
> (i) An Interstate System highway for which an alternative route is not designated by a State routing agency as provided in this section, and
>
> (ii) A State-designated route selected by a State routing agency (see § 171.8 of this subchapter) in accordance with the DOT "Guidelines for Selecting Preferred Highway Routes for Shipments of Large Quantity Radioactive Materials".
>
> (2) When a deviation from a preferred route is necessary (including emergency deviation, to the extent time permits), routes shall be selected in accordance with paragraph (a) of this section. A motor vehicle may deviate from a preferred route under any of the folowing circumstances:
>
> (i) Emergency conditions that would make continued use of the preferred route unsafe.
>
> (ii) To make necessary rest, fuel and vehicle repair stops.
>
> (iii) To the extent necessary to pick up, deliver or transfer a highway route controlled quantity package of radioactive materials.

Briefly stated, HM-164 requires carriers of highway route controlled quantity radioactive material to operate over Interstate System highways selected to reduce time in transit except where an available Interstate System beltway or bypass allows them to avoid city centers. Carriers are allowed off the Interstate System only under the circumstances described in §177.825(b)(2):

1. To follow a state-designated alternate route;
2. In a documented case of emergency;
3. To make necessary stops for rest, fuel or vehicle repairs; or,
4. To travel to and from a pick-up or delivery site not located on an Interstate System highway.

In its notice of proposed rulemaking, DOT had discussed the technical basis for its reliance on the Interstate System of highways. Generally, the designation of these highways as preferred routes was based on an overall performance rating with respect to lower accident rates and their capacity for reducing transit times. For the most part, public comment expressed support for this proposal as well as the related provision allowing states the prerogative of modifying the preferred status of Interstate highways by designating other roads as acceptable alternatives.

Several commenters pointed out, and DOT acknowledged, that each of the 42,500 miles of Interstate highway is not sufficiently consistent in design, engineering or accident history to provide an even correlation between the statistical safety of the system's parts and that of the whole. This was one of the reasons for enabling the states to modify the preferred status of Interstate segments for which more acceptable alternatives exist. As a basic routing system, however, even in the absence of state action, the Interstate highways are well-suited for the use required by HM-164. They provide a baseline measure for states to use in determining whether potential alternative routes offer an equivalent or greater level of safety. This basic system of primary routes also supports emergency response planning by increasing the confidence of planners in their knowledge of routes to be traveled.

The requirement that carriers of highway route controlled quantity shipments of radioactive material use an Interstate bypass or beltway to avoid urban centers was generally recognized by commenters to be a reasonable precaution. This requirement did not, however, receive unanimous approval.

Some commenters suggested that the use of beltways would not automatically result in the avoidance of all heavily populated areas and that, during peak traffic hours, it may be less hazardous to direct shipments over an Interstate through route rather than a beltway. Another commenter pointed to situations where there were multiple beltways around a metropolitan area and expressed concern that HM-164 might allow carriers to operate over the shorter circumferential route, despite the availability of a second route with superior design standards and lower population density.

DOT responded to these concerns in two ways. First, it reaffirmed its belief that packages of highway route controlled quantity radioactive material could be transported over any Interstate highway, and most other comparable routes, with a confident level of safety. Then, it stated forcefully that its reaffirmation was in no way intended to discourage state governments from adopting reasonable routing rules which increase this level of confidence. It was for this reason that HM-164 included a mechanism for state designation of alternate routes.

## State Designation of Alternate Preferred Routes

As stated earlier, DOT recognized that not all segments of the Interstate System of highways were of equal calibre and that in certain areas non-Interstate routes were available which could provide an equal or greater level of safety. DOT further acknowledged that the task of identifying preferable alternative local routes was best performed by the states and developed the mechanism for state-designation of alternate routes which was referred to previously.

As set forth in 49 CFR 177.825(b)(1)(ii), carriers may operate over a state-designated alternate route which is selected: (1) by a state routing authority and (2) in accordance with DOT guidelines. These requirements are described below.

The term "state routing agency" is defined at 49 CFR 171.8 as follows:

> "State routing agency" means an entity (including a common agency of more than one State such as one established by Interstate compact) which is authorized to use State legal process pursuant to §177.825 of this subchapter to impose routing requirements, enforceable by State agencies, on carriers of radioactive materials without regard to intrastate jurisdictional boundaries. This term also includes Indian tribal authorities which have police powers to regulate and enforce highway routing requirements within their lands.

This definition does not include a bridge/tunnel/turnpike authority unless that authority is empowered to impose routing rules on state highways generally. This definition, however, may apply to more than one agency in a single state sharing responsibility for designating preferred highways. Routes designated by a state routing agency may be enforced by that agency or by any other appropriate state agency.

Many commenters felt that local governments should be responsible for routing within their jurisdictions. First, they argued that local governments have the primary responsibility for protecting the health and safety of their citizens and therefore should determine whether routes through their jurisdictions are acceptable. Secondly, they argued that route selection was a site-specific process and that local officials were most knowledgeable about local road conditions. However, DOT saw both safety and practical problems associated with placing ultimate routing authority in the tens of thousands of local jurisdictions in this country.

DOT noted that local jurisdictions are inherently limited in perspective with respect to establishing routing requirements. Because they are accountable only to their own citizens, local governments may not take sufficient account of the adverse impacts of their routing decisions on surrounding jurisdictions. Uncoordinated and unilateral restrictions on the highway transportation of radioactive materials would simply not be conducive to safe transportation. Indeed, it was the proliferation of such restrictions which provided the impetus for DOT's development of HM-164.

DOT believed that state governments could provide the key to ensuring that the safest routes were used to transport high-level radioactive materials. A state government has a much broader perspective than local governments because it is responsible for the safety and welfare of all its communities. A state can not only assess the safety impacts of a routing decision on all communities, but can also address the concerns of tunnel, turnpike and bridge authorities. States thus have the capability, through existing administrative and lawmaking procedures, to incorporate local input directly into their routing analyses. At the same time, states have the capability of working with the Federal government and are familiar with implementing regulations under a variety of Federal programs.

Many local officials expressed concern that the states would not actively pursue local interests before designating routes. DOT considered establishing specific guidelines to ensure a formal procedure for local consideration, but found that this approach was impractical given the variations in organizational structure and administrative processes from state to state. Instead, DOT took two steps to ensure consideration of local viewpoints. First, it established a general requirement that states consult with affected local jurisdictions before designating an alternate preferred route. Second, it developed a set of guidelines to assist states in assessing the safety of potential alternate routes. DOT included both steps in its definition of what constitutes a state-designated route:

> "State-designated route" means a preferred route selected in accordance with U.S. DOT "Guidelines for Selecting Preferred Highway Routes for Large Quantity Shipments of Radioactive Materials" or an equivalent routing analysis which adequately considers overall risk to the public. Designation must have been preceded by substantive consultation with affected local jurisdictions and with any other affected States to ensure consideration of all impacts and continuity of designated routes. (49 CFR 171.8).

One other change to the HMR affects the selection of highway routes for radioactive materials. It concerns the use of urban vehicular tunnels used for mass transportation. Prior to the adoption of HM-164, §177.810 of the HMR stated explicitly that no requirement of the HMR should be so construed as to nullify or supersede state or local regulations regarding the kind, character or quantity of any hazardous material permitted to be transported through any such tunnel. Under HM-164, §177.810 was revised to except radioactive materials from state and local requirements that restrict their transportation through urban vehicular tunnels used for mass transportation. This action was taken to facilitate accomplishment of the basic objective of the general routing rule to minimize radiological risk and to allow the states flexibility to designate preferred routes for large quantity shipments.

With regard to highway route controlled quantity shipments, DOT took the position that tunnel restrictions should not be based merely on the nature of the facility but on the overall safety risks between available routes, and that such restrictions should be imposed only by an agency with state-wide responsibilities which permit adequate consideration of other alternative routes. Therefore, use restrictions on tunnels should not be determined solely by facility operators. Instead, the use of tunnels should be available for consideration as possible alternatives in the state process of route designation. The amendment to § 177.810 was necessary to enable states to evaluate the site-specific risks involved over various routes without being hampered by locally imposed constraints which could be counterproductive.

In the absence of a state routing agency's action to review the status of tunnels located within its jurisdiction, carriers of highway route controlled quantity radioactive material are generally limited to such facilities that are part of an Interstate System highway. Other placarded carriers can use such facilities only after considering the safety factors specified in § 177.825(a), the general routing rule.

Shipping Papers

For purposes of identification and enforcement, HM-164 added a requirement that shippers enter "Large quantity" as part of the hazardous material description on the shipping paper. This requirement, set forth at §172.203(d)(1)(iii) of the HMR, was subsequently amended by HM-169 to reflect adoption of the term "highway route controlled quantity." The purpose of the additional description on the shipping paper is to alert the carrier that he has received a package of radioactive material for which routing controls are required and that a route plan must be prepared.

Placarding

Under HM-164, vehicle identification requirements were added to Part 172 of the HMR to require a white background for the RADIOACTIVE warning placard. The white background was devised to aid enforcement personnel in distinguishing highway route controlled quantity shipments from other placarded shipments for which the use of preferred routes is not required.

Route Plans

An essential component of HM-164 is the route plan which must be prepared by the carrier (or his agent) for each shipment of highway route controlled quantity radioactive materials. This requirement is codified at 49 CFR 177.825(c):

> (c) A carrier (or his agent) who operates a motor vehicle which contains a package of highway route controlled quantity radioactive materials as defined in §173.403(1) of this subchapter shall prepare a written route plan and supply a copy before departure to the motor vehicle driver and a copy to the shipper (before departure for exclusive use shipments, or otherwise within fifteen working days following departure). Any variation between the route plan and routes actually used, and the reason for it, shall be reported in an amendment to the route plan delivered to the shipper as soon as practicable but within 30 days following the deviation. The route plan shall contain–
>
> (1) A statement of the origin and destination points, a route selected in compliance with this section, all planned stops, and estimated departure and arrival times; and
>
> (2) Telephone numbers which will access emergency assistance in each State to be entered.

DOT acknowledged that a great number of variables had to be considered in route planning when one looked at the aggregate of total packages, multiple shipping locations and widespread destinations. However, for any particular shipment, the routing possibilities are limited by the safety criteria established under HM-164 and the practical alternatives such as available roadways. For these reasons, DOT did not believe that the requirement imposed any severe administrative burdens beyond the capacity of the carriers, nor did it have cause to expect that carriers woul be indiscriminate in their selection of routes. Furthermore, DOT recognized that the interest of shippers in routing decisions would be very influential in the final selection.

Under the provisions of §177.825(c), the carrier is responsible for preparing a route plan and providing copies to the driver of the transport vehicle and to the shipper. Under the provisions of §173.22, the shipper is responsible for providing a copy of the route plan to DOT within ninety days following the shipment. The purpose for this requirement was to enable DOT to consolidate the information contained in the route plans for use by interested parties, especially state and local governments. Furthermore, DOT noted a rulemaking of the Nuclear Regulatory Commission (NRC) which provides for advance notification of each state through which spent nuclear fuel or other high-level waste is to be transported.

## Driver Training Requirements

Requirements for driver training and certification, as adopted under HM-164, are codified at 49 CFR 177.825(d). Restated briefly, the driver of a vehicle transporting highway route controlled quantity radioactive material is required to have been trained, and to have in his immediate possession a certificate evidencing his having trained, in the following:

(1) The requirements of the HMR pertaining to radioactive materials in Parts 172 (hazardous materials communications), 173 (general requirements for shipments and packagings), and 177 (carriage by public highway);

(2) The properties and hazards of the radioactive materials being transported; and

(3) Procedures to be followed in case of an accident or other emergency.

Evidence of such training is also required to be placed in the driver's qualification file which the motor carrier must maintain in accordance with the Federal Motor Carrier Safety Regulations (49 CFR 391.51).

These requirements were based on DOT's established policy regarding hazardous materials driver training, i.e. to require that training be provided for the material involved and that the training program be implemented within the general guidelines provided by DOT. Any driver training requirement must be able to accommodate the many variables involved in hazardous materials transportation such as: the different materials and hazards associated therewith; differences among drivers' knowedge and experience; and the wide differences in the effectiveness of various training methods. For this reason, DOT determined that the driver training requirements of HM-164 should be of a general nature, thereby allowing the flexibility to develop individualized training programs that will accomplish the Department's stated safety objectives.

Physical Security Plan

HM-164 requires motor carriers to transport shipments of irradiated reactor fuel in compliance with a physical protection plan established by the shipper:

> (e) A person may transport irradiated reactor fuel only in compliance with a plan if required under § 173.22(b) of this subchapter that will ensure the physical security of the material. Variation for security purposes from the requirements of this section is permitted so far as necessary to meet the requirements imposed under such a plan, or otherwise imposed by the U.S. Nuclear Regulatory Commission in 10 CFR Part 73. (49 CFR 177.825(e)).

Under § 173.22(b), shippers are required to provide physical protection under either a plan required by the NRC (Ref. 12) or an equivalent plan approved by DOT. These plans, as approved by NRC or DOT, may sometimes involve transportation requirements different from those specified in § 177.825 but designed to assure at least an equal measure of protection to public safety, and they take precedence over the other rules published in § 177.825.

Shipments affected by this requirement include those made by any NRC licensee, and consignments from the Department of Defense (DOD) and the Department of Energy (DOE) transported by for-hire carriers (except defense-related shipments accompanied by personnel specifically designated by or under the authority of those agencies to preserve national security). This exception was not newly created under HM-164. The HMR (at §§ 173.7(b) and 177.806(b)) previously established an exception in the case of shipments escorted by personnel specifically designated by or under the authority of DOD or DOE, for the purpose of national security, which freed common and contract carriers from compliance with the HMR. Consequently, HM-164 requires the respective departments (unless they perform the transportation with their own vehicles) to either submit copies of their physical protection plans to MTB for approval, or, when necessary to preserve the national security, provide an escort of personnel specifically designated by or under their authority. Shipments of irradiated reactor fuel by DOE in support of its research and development activities are not generally considered by DOT to be carried out to preserve national security (as opposed to defense-related shipments made by both DOD and DOE) and are therefore subject to the HMR.

Appendix A

In addition to the requirements described above, HM-164 contained an Appendix A to Part 177 of the HMR which set forth the Department's views regarding the preemptive effects of the routing rules. The Appendix provides that the Department generally regards state and local requirements to be inconsistent if they:

- prohibit the highway transport of large quantity radioactive materials without providing for an alternative highway route for the duration of the prohibition;
- require additional or special personnel, equipment, or escort;
- require additional or different shipping paper entries, placards, or other hazard warning devices;
- require filing route plans or other documents containing information that is specific to individual shipments;
- require prenotification;
- requirement accident or incident reporting other than as immediately necessary for emergency assistance; or
- unnecessarily delay transportation.

Appendix A is not a regulation which imposes obligations to act. It is the Department's interpretation of the general preemptive effect of its regulation on state and local requirements. It was not intended to replace the two-prong test for determining the inconsistency of an existing state or local rule. Rather, it was intended to advise state and local governments contemplating rulemaking action as to the likelihood of such actions being deemed inconsistent.

## JUDICIAL REVIEW OF HM-164

Shortly after HM-164 was published as a final rule, the City of New York brought an action in the U.S. District Court for the Southern District of New York. The City sought a ruling that HM-164 was an invalid rulemaking and, therefore, without preemptive effect. The District Court, in an exhaustive opinion, ruled that HM-164 violated both the HMTA and the National Environmental Policy Act (NEPA). (*City of New York v. DOT*, 539 F. Supp. 1237 (1982).) Accordingly, the District Court permanently enjoined the preemptive effect of HM-164 on New York City's ban on the highway transportation of radioactive materials.

DOT appealed this decision before the Second Circuit Court of Appeals. On August 10, 1983, the Second Circuit reversed the judgment of the District Court and remanded the case with instructions to enter a judgment upholding the validity of HM-164. (715 F2d 732 (1983).) The reversal was based upon the following major findings:

(1) The HMTA does not require DOT to adopt rules which maximize safety. Rather, it authorizes DOT to set acceptable levels of safety.

(2) None of the HMTA's provisions remotely suggests a Congressional intent to mandate comparisons among different transportation modes.

(3) DOT did not violate NEPA when it declined to consider barging as an alternative in a rulemaking dealing with highway transportation.

(4) Having conceded the infinitessional probability that the rule might lead to catastrophic consequences, DOT did not violate NEPA by concluding that an environmental impact statement was not required.

The City subsequently sought Supreme Court review of the Circuit Court's reversal. On February 17, 1984, the Supreme Court dismissed the City's appeal (104 S. Ct. 1403), thereby establishing with finality the validity of HM-164.

## RECENT INCONSISTENCY RULINGS

Following DOT's adoption of HM-164 and the flurry of litigation it prompted, questions inevitably arose as to the consistency or inconsistency of specific state and local rules on transportation of radioactive materials. More than a dozen inconsistency ruling proceedings have been initiated. In November of 1984, DOT issued nine related rulings (Ref. 13) dealing with state and local restrictions in Michigan, New York and Vermont which had effectively blocked the transportation of spent nuclear fuel which Canada was treaty-bound to return to the United States.

Those rulings expanded and refined DOT's earlier statements on what it regards as appropriate or inappropriate matters for state and local regulation. A review of the findings made in those rulings should provide a better understanding of DOT's view of the regulatory role of state and local governments. It will also reveal what might be anticipated in future inconsistency rulings.

Of the nine rulings, two resulted in a finding of no inconsistency. These were decided primarily on procedural grounds and are not particularly instructive. The other seven rulings involved substantive regulatory schemes which had many factors in common and can best be summarized by topic.

Assertion of Intent to Regulate - All seven jurisdictions either implied or expressly stated an intent to regulate the transportation of radioactive materials. The language of the HMTA's preemption provision clearly indicates that Congress did not intend to preclude all state or local regulations, but only those that are inconsistent. Therefore, those provisions which express an intent to regulate were found to be fully consistent with the HMTA.

Prenotification/Permit Requirement - All seven jurisdictions required some form of transportation permit linked to a prenotification requirement. Where the state/local prenotification requirement was the same as the Federal requirement, the provision was found to be, in effect, an adoption of the Federal rule and, therefore, fully consistent. Where it differed from the Federal requirement, either by requiring the same information to be submitted to different parties, or by requiring submission of additional information, documentation and/or certifications, the provision was found to be inconsistent. Provisions which prohibited the interstate transportation of radioactive materials without a state/local permit were found to be inconsistent *per se*.

In reaching these findings DOT relied on the express Congressional intent in enacting the preemption provision of the HMTA: "...to preclude a multiplicity of state and local regulations and the potential for varying as well as conflicting regulations in the area of hazardous materials transportation." By adoption of HM-164, the Department established a national system of highway routing for radioactive materials, one in which the low and equitably distributed level of risk from transportation is far outweighed by the societal benefits derived from that transportation. This nationally uniform system of highway routing would be completely nullified if interstate carriers of radioactive materials were unable to proceed until they had satisfied the infinitely diverse advance notification and permit application requirements of every jurisdiction along the route to be traveled.

Additional Personnel, Equipment, Escorts, etc. - Six jurisdictions called for transporters of radioactive materials to devote additional resources in the form of personnel and equipment or reimbursement for those additional resources the jurisdiction chose to provide. In each case, the state/local requirement differed from the Federal requirement and was, therefore, found to be inconsistent. The basis for these rulings is the same as described in the foregoing discussion of prenotification/permit requirements. Absent the showing of a unique local safety problem, no justification exists for requiring personnel, vehicles or equipment in excess of that level of recources deemed to be adequate for transportation safety on a national basis.

Additional Packaging/Container Requirements - In one case a state agency imposed additional design and test criteria on shipping casks used to transport spent fuel over certain major bridges and waterways. Asserting that the Federal standards were inadequate to meet local conditions, the state chose this method to overcome the perceived Federal inadequacy. Prior inconsistency rulings have firmly established the exclusive Federal role in hazardous materials containment systems. Such unilateral imposition of design changes on a shipping container as complex as a spent fuel cask is imcompatible with safe, efficient interstate transportation. If, as the state alleged, the Federal standards are inadequate, the state has recourse to three (possibly concurrent) alternatives to the imposition of independent design requirements: (1) petition for a waiver of preemption; (2) petition for rulemaking to change the Federal standard; and (3) designate alternate highway routes which avoid major bridges. For these reasons, the additional design and test requirements were found to be inconsistent.

Insurance Requirements - Five jurisdictions required levels of insurance which exceeded those established by Federal law. In the course of developing HM-164, the Department examined the issue of indemnification and concluded that Federal law provided adequate coverage. In the absence of a clear showing that the transportation of radioactive materials through the enacting jurisdiction poses a financial risk which exceeds the level of indemnification provided by Federal law, such requirements impede the nationally uniform system of highway routing established under the HMTA. By denying use of preferred routes to transporters who have not met local insurance requirements, such requirements have the effect of diverting such shipments into other jurisdictions. While a community may seek to reduce its exposure to the risks inherent in such transportation, it may not do so by exporting that risk to its neighbors. For the foregoing reasons, the requirements for additional insurance coverage were found to be inconsistent.

Transport Inspection - In two cases the state requirements included express provisions concerning inspection of radioactive materials transports to ensure compliance with applicable state and Federal laws. While noting that a state rule was "applicable" only if consistent, the Department found that such provisions represented a legitimate exercise of the state's inherent police powers. State enforcement of Federal and (consistent) state regulations on hazardous materials transportation is a critical element of a regulatory system of national applicability. Accordingly, both provisions were found to be fully consistent with the HMTA and the Federal regulations.

## CONCLUSION

DOT has devoted several years to developing HM-164 and defending various challenges to its validity. To date, no evidence has been presented which rebuts the Department's conclusion that, when Federal rules are complied with, high level radioactive waste can be transported over any Interstate highway, and most other comparable routes, with a confident level of safety.

## REFERENCES

1. "Radioactive Materials; Routing and Driver Training and Routing Exemptions," Final Rule, 46 FR 5298, January 19, 1981.

2. Hazardous Materials Transportation Act, 49 U.S.C. 1801 *et seq.*

3. Senate Report No. 1192, 93d Congress 2d Session (1974).

4. *Ibid.*, pp. 37-38.

5. 41 FR 38167, September 9, 1976.

6. *Ray V. Atlantic Richfield Co.*, 435 U.S. 151, 158 (1972).

7. IR-1, 43 FR 16954, April 20, 1978.

8. "Highway Routing of Radioactive Materials; Inquiry", 43 FR 36492, August 17, 1978.

9. "Highway Routing of Radioactive Materials; Proposed Rulemaking." 45 FR 7140, January 31, 1980.

10. "Requirements for Transportation of Radioactive Materials" 48 FR 10218, March 10, 1983.

11. "Advance Notification to Governors Concerning Shipments of Irradiated Reactor Fuel", 47 FR 603, January 6, 1982; codified at 10 CFR, Part 73.

12. "Physical Protection of Irradiated Reactor Fuel in Transit", 45 FR 37399, June 30, 1980; codified at 10 CFR, Part 73.

13. IR-7 through 15, 49 FR 46632, November 27, 1984.

## STATEMENT OF WILLIAM W. HOOVER

Mr. Florio. Mr. Hoover.

Mr. Hoover. I, too, appreciate the opportunity to appear before this committee. Perhaps before we start, however, since many of us deal on perceptions, we have a very short, less than 1 minute, video clip that will show you an actual cask being hit by a train going at 100 miles an hour. I can explain that to you, but I think it would be more graphic if you can see it.

[Video presentation.]

Mr. Hoover. Thank you very much.

That was a test done in the United Kingdom of the train and three cars. The train was accelerated to 100 miles an hour, not unlike tests we have conducted. I appreciate the broader context in which the chairman may seek to view the hearing today.

However, I will address my remarks to the Brookhaven fuel shipments. These shipments of spent nuclear fuel from BNL are an integral part of a program of nuclear activities which the DOE is statutorily responsible for implementing. In all of these activities, Secretary of Energy Herrington and I are dedicated to ensuring the safety of the public, as well as our employees.

As a key element for ensuring safety, these activities are carried out under an extensive regulatory framework established by the DOE, Department of Transportation [DOT], and the Nuclear Regulatory Commission [NRC]. In fulfilling our Federal responsibilities, we must meet the same or equivalent requirements as the private sector for carrying out similar activities. This regulatory framework and the great degree of care exercised in carrying out our activities has resulted in an extraordinary safety record of almost 40 years of radioactive materials shipments without any radiological releases serious enough to be a threat to public health and safety.

I would like to assure this committee that since safety is paramount with Secretary Herrington, myself, and others within the DOE, all necessary steps are being taken to ensure safety continually in packaging and shipping operations, including spent nuclear fuel shipments from BNL.

The BNL reactor discharges 14 spent fuel elements per month during normal operations. Shipments of this spent fuel from the storage pool were suspended in 1976. By January 1985 this spent fuel had accumulated to the point that safety considerations required initiation of removal of the spent fuel. Prior to initiating shipments, extensive discussions were held with New York State and local government officials representing the area through which the spent fuel was to be shipped.

Following these discussions and written agreements between DOE and New York City, shipments were initiated on January 21, 1985 using the MH-1A cask. In parallel with our preparations for shipments, we had submitted a request to the NRC for certification of this cask to be used for future shipments of spent fuel from university research reactors. On May 21, 1985, we were advised by the NRC that they required additional structural analysis information to support our request for certification. This information was necessary to verify the MH-1A casks had adequate margins of safety under all postulated accident conditions.

After we learned that the NRC had additional questions regarding the calculations, we suspended BNL shipments in the MH-1A until the additional data could be developed and provided to NRC.

I understand this MH-1A cask had previously operated safely for many years under an NRC certificate of compliance. The cask was subsequently modified for DOE use after consultations with the NRC staff. It was then evaluated and considered safe by two different DOE and contractor engineering groups prior to DOE use in the BNL shipping campaign. Subsequently in a May 21, 1985 meeting with NRC, and through subsequent additional correspondence, omissions in the SARP were identified which need to be remedied.

In the interest of time, I want to conclude by saying we will continue to seek better ways to improve our program to assure the safe, secure, environmentally acceptable, efficient and economic packaging and shipment of radioactive material.

Thank you very much.

[The prepared statement of Mr. Hoover follows:]

# TRANSPORTATION OF RADIOACTIVE MATERIALS

Statement by
William W. Hoover
Assistant Secretary for Defense Programs
U.S. Department of Energy

Mr. Chairman, I appreciate this opportunity to discuss Department of Energy (DOE) activities involving shipments of spent nuclear fuel from the Brookhaven National Laboratory (BNL) facility located at Upton, Long Island, New York, to the Idaho National Engineering Laboratory near Idaho Falls, Idaho.

These shipments of spent nuclear fuel from BNL are an integral part of a program of nuclear activities which the DOE is statutorily responsible for implementing. In all of these activities, Secretary of Energy Herrington and I are dedicated to ensuring the safety of the public, as well as our employees. As a key element for ensuring safety, these activities are carried out under an extensive regulatory framework established by the DOE, Department of Transportation (DOT), and Nuclear Regulatory Commission (NRC). In fulfilling our federal responsibilities, we must meet the same or equivalent requirements as the private sector for carrying out similar activities. This regulatory framework and the great degree of care exercised in carrying out our activities has resulted in an extraordinary safety record of almost 40 years of radioactive materials shipments without any radiological releases serious enough to be a threat to public health and safety.

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Following these discussions, shipments were initiated on January 21, 1985 using the MHIA cask. In parallel with our preparations for shipments we had submitted a request to the NRC for certification of this cask to be used for future shipments of spent fuel from university research reactors. On May 21, 1985, we were advised by the NRC that they required additional structural analysis information to support our request for certification. This information was necessary to verify the MHIA Casks had adequate margins of safety under all postulated accident conditions.

To ensure that we have maintained the appropriate margin of safety of the MHIA cask, after we learned that the NRC had additional questions regarding the calculations shown in the Safety Analysis Report for Packaging (SARP) for the MHIA, we suspended BNL shipments until the additional data could be developed and provided to NRC.

I understand this MHIA cask had previously operated safely for many years under an NRC certificate of compliance. The cask was subsequently modified for DOE use after consultations with the NRC staff. It was then evaluated and considered safe by two different DOE and contractor engineering groups prior to DOE use in the BNL shipping campaign. Subsequently in a May 21, 1985, meeting with NRC and through subsequent additional correspondence from NRC, omissions in the SARP were identified which need to be remedied.

## Transportation-Risks

Diligence, care, quality assurance, and quality control inspections that go into the design, fabrication, and maintenance of the casks and containers used for hazardous radioactive materials transportation ensure that radioactive material transportation operations do not cause undue risk to the health and safety of the public. Even in postulated worst-case accident scenarios, backed up by experiments with casks traveling at 80 miles per hour crashing into unyielding barriers and train/truck grade crossing accidents followed by the worst-case types of fires, spent nuclear fuel shipping casks have retained integrity. We have found through research that even explosives or projectiles do not produce significant loss of contents from the casks. The ability of casks to withstand such accidents is one of the reasons the accident safety record for those materials is so outstanding. As indicated earlier, it is my understanding that in almost 40 years of radioactive materials shipments there has not been a single death or injury due to the radioactive nature of the shipments, nor has there ever been a release of radiation serious enough to be a threat to public health and safety.

## How Many Shipments?

The Department of Energy, in administering its broad program missions for energy and defense, makes about 200,000 shipments in commerce per year. Approximately 25,000 of these are radioactive materials shipments. Shipments include uranium products used in the fabrication of reactor fuel; spent nuclear fuel; radioactive wastes and byproducts; special nuclear materials; and radioisotopes for medicine, industry, and research. Since 1962, there have been a total of 346 spent nuclear fuel shipments made safely from the BNL facility on Long Island, New York, to both South Carolina and Idaho. This compares to over 5,000 shipments to date of spent nuclear fuel by both the Government and the nuclear industry.

## Federal Regulations

As I have already indicated, these shipments are packaged and transported in accordance with Federal regulations administered by the U.S. Department of Transportation under 49 Code of Federal Regulations (CFR) Parts 100-199. Packages are evaluated against the packaging performance standards promulgated by the U.S. Nuclear Regulatory Commission under 10 CFR Part 71, as well as DOE environmental health and safety standards. Equivalent regulations are in use worldwide. All applicable regulations are implemented by the DOE through the issuance of DOE orders. The DOE field and contractor personnel who are engaged in transportation and packaging are trained extensively. The contractor and field offices are regularly appraised by a separate part of DOE responsible to the Secretary and independent from the program organizations to assure proper performance and compliance with these requirements.

We in the DOE strongly support effective and consistent safety. We believe that the existing DOE requirements, which have evolved and been proven effective over many years are adequate to protect the public health, safety, environment, and security with respect to the packaging and transportation of radioactive materials. The excellent transportation safety record of both the DOE and nuclear industry confirms the effectiveness of the transportation regulations that emphasize packaging design and integrity as the primary element in assuring public safety.

## Packaging Certification for Hazardous Radioactive Materials

The DOE has been granted the authority by DOT to certify radioactive material packagings for DOE shipments to the same safety standards defined in the NRC regulations (10 CFR 71) and the International Atomic Energy Agency (IAEA) regulations.

The Type B package design is required for shipping substantial amounts of high level radioactive materials. Before a Type B hazardous radioactive material packaging design can be approved for shipment, it must be shown analytically to be capable of withstanding a series of tests. These are designed to demonstrate the adequacy of the package to survive, with a substantial safety margin, the actual damage a package might encounter in a hypothetical severe transportation accident. The accident damage test sequence specified in the DOT and the NRC regulations includes a drop test, followed by a puncture test, followed by fire and water immersion tests.

This test demonstrates the ability to withstand the type of damage that might occur to a package in a high-speed truck accident or train derailment, causing the package to impact on a hard (but not unyielding) surface, such as a bridge abutment, and then to smash through wreckage or onto rocks, and then to be directly involved in a totally engulfing cargo fire, and then be submerged in a river.

A specific (SARP) must be prepared for each packaging type. This SARP describes in detail the proposed transport package design, conformance to regulatory requirements, operating procedures, and quality assurance. The SARP further documents in full the technical basis for determining the acceptability of the design to meet regulatory standards. Independent evaluations by Federal certifying offices are conducted prior to certifying use of the packaging. This evaluation includes structural analyses; thermal, containment, shielding, and nuclear criticality control evaluations; and other analyses.

## Quality Assurance and Quality Control

The quality assurance program establishes the procedures and oversight needed to assure that the package design, fabrication and operations are carried out in a disciplined and documented manner. Quality control in turn covers all aspects of the actual package fabrication and assures that the package meets design requirements. Appropriate tests and inspections prior to each shipment assure the packaging is proper for the contents being shipped and that all limitations on radioactivity and criticality are being met.

Quality surveys are made of packaging manufacturers to assure that they have capabilities and internal quality assurance programs consistent with the requirements. Periodic quality assurance appraisals are made on the manufacturers, DOE contractors' shipping facilities, and DOE field offices to assure the continued effectiveness of the quality functions.

## Routing Policies

The DOE's routing policies for radioactive material transportation are consistent with the DOT regulations 49 CFR 177.825. Briefly, these policies are as follows:

Under existing DOE procedures, the designated carrier of radioactive material is permitted to select from routes identified as "preferred" by the DOT or the States. A preferred route as defined in the DOT guidelines is (1) an interstate system highway, including beltways around major cities; or (2) an alternate route selected by a State routing agency in coordination with local municipalities in following the DOT guidelines.

On BNL spent fuel shipments, the DOE carrier is currently using an interstate highway route specifically requested by New York City officials in July 1984. Although this route is more circuitous than other more direct interstate routes, the DOE and its contractors agreed to this route as a good faith effort to address New York City concerns.

## Training

Drivers of vehicles transporting these spent fuel shipments requiring highway route-control under DOT regulations receive special training as required by the DOT. The training includes hazardous materials transport regulations, the properties and hazards of radioactive materials, and emergency procedures. Drivers must receive additional training every 2 years.

In our program of commitment to safety and compliance with hazardous materials regulations, the DOE also requires a training program for contractor employees who are responsible for shipments of radioactive materials in order to assure compliance with applicable transportation requirements and regulations. This year, the Department has sponsored 12 workshops on regulatory compliance (8 basic and 4 advanced) at various locations throughout the country. Further, the Department sponsored four regional transportation emergency response courses geared to provide first responders (local policemen and firemen) information on how to react to a radioactive materials incident.

In addition, the Department sponsors a certification program for its DOE and contractor transportation managers. This enhances their management capabilities in the areas of logistics, planning, economics, laws and regulations, institutional relationships, and other functions essential to the proper discharge of the broad responsibilities of a transportation and traffic manager. This program also helps to maintain a backup capability to assure the availability of qualified traffic managers to replace traffic managers who are retiring or departing for other reasons.

## Physical Security

Detailed physical security plans as required by the regulations are specifically defined by DOE orders and verified by field organizations to ensure protection against theft, diversion, or sabotage for certain types of radioactive material shipments. The degree of protection provided is in accordance with the strategic quantities and value of the materials or the potential risk to public safety and the environment. NRC publishes and enforces corresponding physical protection requirements for private shippers.

## Emergency Response

In the unlikely event of a release of radioactive material in a transportation accident or incident, the DOE has demonstrated capability and will make available from its resources radiological advice and assistance, including response personnel as appropriate to assist local responders in protecting the public health and safety or to assist in mitigation of radiological hazards. DOE will take action upon request from NRC licensees, Federal, State, and local agencies, private organizations, or individuals. Additionally, the DOE offers a number of training and orientation programs for responders in coordination with other Federal agencies such as the Federal Emergency Management Administration, the DOT, and the NRC.

## Indemnity Coverage in Case of Nuclear Incident

In the unlikely event that a nuclear incident should occur and result in public damages, indemnification is provided under the Price-Anderson Act.

Pursuant to this act, the DOE indemnifies its contractors and other persons who may be liable for a nuclear incident at a DOE contract location or in the course of transportation to or from a contract location. Presently, both the indemnity available and the aggregate liability of persons indemnified are limited to $500 million dollars. The indemnity extends to all persons who may be liable in connection with the transportation of these nuclear materials. The Act is continued until 1987, and Congressional actions on consideration of extension are currently underway.

We will continue to seek better ways to improve our program to assure the safe, secure, environmentally acceptable, efficient, and economic packaging and shipment of radioactive material.

Thank you. This completes my statement. I will be happy to answer any questions you may have.

Mr. **Florio**. Thank you very much.

The statute, as well as your comments, talk about the need for cooperation and presumably your agency's role in facilitating cooperation toward the end of safety, balance and all of that.

What has been your experience in the dilemma we have here at hand? Have you played an active role in trying to resolve the difficulties between these two competing States? Do you regard yourselves as being required to play some intermediate role—rather a mediating role—in trying to resolve this dispute? Let me ask DOT first.

Mr. **Tenley**. We certainly view the act as ascribing that role to the Department of Transportation. The way we deal with States and local governments, there is primarily two ways, through our inconsistency preemption process, which I will characterize as quasi adjuricatory. But also in a regulatory fashion by providing a HM-164, there is a role for States in designating alternate routes. So at those two levels, I would—we believe strongly in that reponsibility——

Mr. **Florio**. That is nice in the abstract. But what, specifically, have you taken part in in terms of discussions between the competing agencies and competing governmental units here?

Mr. **Tenley**. The Department has been active in the dialog between the Nuclear Regulatory Commission and Department of Energy with respect to the cask question.

Mr. **Florio**. The routing question in question between the two States?

Mr. **Tenley**. The routing question has been addressed but I have to note the fact a proceeding has begun and been going on for sometime. When we are in the confines of that proceeding our ability to go outside that proceeding are——

Mr. **Florio**. I appreciate that. I suppose my point is what happened prior to the proceeding? Whether or not this situation can be resolved in some satisfactory way, I am asking about the agency's predisposition to try to mediate an agreement so we don't have to get to the point of people invoking waivers or litigation.

I suppose the question is, do you regard it as a function of the agency under the statute to try to resolve early on potential disputes before they get to the point of administrative proceedings or litigation?

Mr. **Tenley**. Yes, I do, and I think we are becoming increasingly aware of that.

Mr. **Florio**. Has that taken place in this matter? Prior to litigation, complaints, and waiver applications, was there any effort to resolve the differences with the agency taking a role in that effort?

Mr. **Tenley**. In the case of New York City?

Mr. **Florio**. Yes.

Mr. **Tenley**. That is not the case. The appropriations started in 1976, about a year after the beginning of the program, and we have been in administrative litigation or judicial litigation with the City of New York.

Mr. **Florio**. How good has the compliance been with HM-164? I assume you keep records with regard to shipments complying with the regulations. It is represented to me information is fed into our computers. What has been the result of that process?

Mr. **Tenley**. The compliance record has been very high. One of the reasons for that is incompliance with certain nuclear regulatory requirements, States are put on notice prior to the shipment and they are able to monitor the progress of the shipment through the State. We monitor the route plans filed with us after the shipments are completed. We have also done some on site inspections both at the beginning of the shipment and termination of shipment as well as enroute, and I would say the compliance record has been outstanding.

Mr. **Florio**. Do you have to do that inspection?

Mr. **Tenley**. Within the Department of Transportation, the enforcement responsibility is spread among various administrations. The Federal Highway Administration I believe has some 130 inspectors who do the highway mode—the Federal Highway Administration has something less than that.

My primary complaint, the Insurance and Special Programs Administration, has but seven inspectors——

Mr. **Florio**. You are including the FRA inspectors as part of your compliance inspection capability?

Mr. **Tenley**. That is correct.

Mr. **Florio**. I mean, as a realistic matter, those people are overtaxed just in terms of inspecting railroads, much less inspecting compliance with the Hazardous Materials Transportation Act. How many pepole do you have, if any, whose exclusive or primary function is monitoring compliance with the Hazardous Materials Transportation Act requirements administered by you?

Mr. **Tenley**. Department-wide?

Mr. **Florio**. Yes.

Mr. **Tenley**. I would say somewhere around 200.

Mr. **Florio**. 200 people whose primary responsibility is compliance——

Mr. **Tenley**. Hazardous materials?

Mr. **Florio**. Yes.

Mr. **Tenley**. No, something significantly less than 200. We can get that for the record.

Mr. **Florio**. We would appreciate that.

[The following information was submitted for the record:]

In response to your request of August 21, 1985, be advised that RSPA has one full-time inspector who works exclusively in the area of radioactive materials transportation, including the transportation of nuclear waste.

Mr. **Florio**. I suspect you don't have any. If you are including the Federal military and highway inspectors, they have multiple responsibilities far beyond this. If they get around to it as a collateral duty, then we can't really feel too confident when you say compliance is high because nobody is looking.

Mr. **Tenley**. Compliance is a function of the squeaky wheel getting the grease. This particular subject has high visibility and high concern for safety, has been closely scrutinized, whereas more prevalent hazardous materials don't get as much attention in making allocation as resources.

Mr. **Florio**. The difficulty with that, of course, is if you have to wait for Bhopal you get lots of EPA inspectors. We really don't want to wait for these things to occur so we get the squeaky wheel axiom.

Let me just ask, do you have penalty authority for violations on companies not complying? Are there penalties assessed, do you know?

Mr. TENLEY. We have authority to $10,000 per violation and criminal authority 5 years and $25,000. We also can assess compliance orders. We also have, both through the Justice Department and our own auspices——

Mr. FLORIO. How much in penalties was assessed in 1984?

Mr. TENLEY. Generally or whether or not——

Mr. FLORIO. We are talking about hazardous materials.

Mr. TENLEY. I will have to supply that for the record.

Mr. FLORIO. We would like you to break it down with regard to high level nuclear fuel.

Mr. TENLEY. There have been no penalties assessed for spent nuclear fuel or highway route control quantities of radioactive material.

Mr. FLORIO. You have driver training requirements administered by your agency as well?

Mr. TENLEY. Yes.

Mr. FLORIO. Who is in charge of implementing that training? Is that the carriers?

Mr. TENLEY. The responsibility is the carriers'.

Mr. FLORIO. Let me say, and I will just conclude, that regarding emergency response capability, this committee has tried on a number of occasions to get authority and funding for regional hazardous materials response training facilities. We have not had a lot of success. My recollection is there is only one in the country in Oklahoma. What are the agency's thoughts? Have they changed their view with regard to opposing authority for regional emergency response transportation training centers?

Mr. TENLEY. I think generally our policy is we certainly are in favor of emergency response capability and training to provide that. We deal with several agencies in that regard, including Federal Emergency Management Agency and several others. The Motor Carrier Safety Act, which provides funding for training for local and State enforcement personnel serves that function. We have a Transportation Safety Institute in Oklahoma City that performs that role.

One of the problems is a data problem. The need for emergency response capability varies in jurisdictions. It varies as to the nature of commodities that go through that jurisdiction. It varies as to the perception of the local jurisdiction as to what it thinks it needs.

Mr. FLORIO. That is the rationale for training centers?

Mr. TENLEY. That is the rationale for supporting the regional training centers. I can't find fault with that. But in the scheme of how we, the Department of Transportation contributes to the emergency response capability, I think it is safe to say in the absence of a huge infusion of funds to accomplish that, it would be a very, very difficult thing to bring off. We believe that the efforts, such as the Chemical Manufacturers Association, FEMA, are providing emergency response guides to almost every fireman, and every police department, provides a scheme that assists in emergency response.

We would be the first to admit you have to increase it. We have examined the question of private foundations among companies providing the funding to provide this training. I have to agree with the chairman it is an open issue which requires a harder look and a continuing look. Where we stand right now is we have not resolved the question of how best to supply it.

Mr. FLORIO. Thank you. My time has expired.

The gentleman from New York.

Mr. SCHEUER. Yes. I will be very brief, Mr. Chairman. I know we are pressed for time.

I am only going to ask a brief question or two to Mr. Hoover, Assistant Secretary Hoover.

Mr. Hoover, on page 3 of your interesting statement, you have a very carefully hedged and guarded statement where you say that you have found that even explosives and projectiles do not produce significant loss of contents from the cask, and that there has never been a release of radiation serious enough to be a threat to public health and safety.

Now, pealing away some of these carefully guarded phrases, would it be an accurate statement to say that there have been accidents and that these accidents have produced some loss of contents of the casks and that there has been some release of radiation?

Mr. HOOVER. Sir, there has never been an accident with the class B type of cask, which we are talking about in the case of Brookhaven shipments, that has caused a radioactive release.

Mr. SCHEUER. Can you tell us why the Nuclear Regulatory Commission, for the last 13 months, has been involved in the most serious discussions and negotiations with you about their perception of serious deficiencies in the MH-1Acask?

Mr. HOOVER. We have at the technical level had discussions. We, in all honesty, believed we had satisfied the concerns of the Nuclear Regulatory Commission prior to the initiation of shipments. It was not until we received their formal response in May 1985 where they stated their reservations had not been fully satisfied that we were aware we had not solved all those problems.

We were not attempting to deceive and certainly our concern was with public health and safety, and we don't want to endanger anyone, whether it is in New York or Connecticut.

Mr. SCHEUER. Of course you don't. We take that as a given.

The problems NRC identified came up in February of 1983, and from May of 1984 until May of 1985, you have been involved in what we in New York had hoped would be fruitful discussions. It never really got to the discussion point. Most of that time was spent in barely successful—I would say, marginally successful—efforts to arrange an appointment with the Secretary. But still there were repeated contacts from us to you—Members of Congress—by letter, telegram, and phone calls to arrange meetings with the Secretaries, and there were repeated oral contacts, telephone contacts with officials beneath the Secretary level.

Yet, during that time, there was never once an intimation from you that you were engaged in discussions with the Nuclear Regulatory Commission, that they had serious problems with the cask under discussion. In point of fact, during this entire 12 month period you were blandly assuring us that there were no problems with the cask and that that cask was problem free.

Yet during that same period you were involved in intense discussions with the Nuclear Regulatory Commission about the integrity of the MH-1a cask.

Now, do you think you were dealing with the Members of Congress in a forthcoming, honorable way we would have the right to expect?

Mr. **Hoover**. Certainly, sir, it was not our intent to deceive you. That is certain. I think we truly believed that we had a cask that had been formerly certified by NRC, that had undergone modifications as a result of consultation with the NRC, and while there had been some question raised among engineers about certain of the analyses, we had been assured all along that there did not seem to be any problems of safety of the use of that cask and, in fact, the requirement for which we were seeking NRC approval is far beyond what we need to satisfy shipments from Brookhaven. We were trying to certify those casks for uses broader than the Brookhaven shipments. I don't think we have any reservations even now in saying that the cask can continue through the ongoing analysis and be certified by the NRC.

Mr. **Scheuer**. I didn't get an answer to my question. While we were discussing the safety of that cask with you for that year during which you were involved in intense discussions with NRC about the clear reservations they had, don't you think it would have been appropriate for you to have mentioned to us that NRC had raised these reservations instead of simply giving us bland assurances there were not problems?

Don't you think you had a moral obligations as colleagues in Government, let us say members of the same team, the executive branch, the legislative branch, whose mission is to protect the health and safety of the American people? Don't you think you had a moral obligation in deference to your mission as well as our mission, to level with us, to give us the benefit of the experiences and the dialogue you were going through, and let us know serious questions had been raised? Don't you think that would have been appropriate?

Mr. **Hoover**. As I said, we believed that we were leveling with you. In hindsight, perhaps, it would now appear that we should have made you more fully aware of these discussions which at our levels of involvement did not appear to be serious enough to bring to your attention.

Mr. **Scheuer**. Do you think the NRC thinks they were serious issues?

Mr. **Hoover**. Obviously when they take action to suspend, they must be concerned.

Mr. **Scheuer**. As a matter of judgment and hindsight, taking into account the seriousness with which they obviously viewed these problem areas, wouldn't you say on reconsideration, it would have been appropriate for Federal officials who were appointed, to discuss with Federal officials who were elected, all of whom had the same mandate, about the serious, unanswered objections the NRC had?

Mr. HOOVER. We were not aware the objections of the NRC were serious until May, 1985. We then did suspend shipments voluntarily.

Mr. SCHEUER. I yield the balance of my time.

Mr. FLORIO. Let me ask one or two questions. You heard me make reference—both of you were here—in my opening statement to the Denver incident, which was not the Government's shining day in terms of people taking responsibility. I categorized it as buck passing. I think that is being accurate if not unkind. Who is to take responsibility, in terms of competing agencies, for routing? In this instance, the Department of Defense cops a plea that they didn't know why they were doing what they were doing, they were just following orders.

Is there consultation between DOT and DOE and DOD and NRC on the routing question? Or, is that exclusively the province of DOT as you both understand it?

Mr. HOOVER. As I understand it, it is the province of DOT, and we abide by the regulations they have set forth.

Mr. FLORIO. Does DOE feel the need or the desire to consult with DOT? Have you ever made any recommendations with regard to modifications or subsitutions for DOT's judgment on routing?

Mr. HOOVER. I am not aware of any, but I am sure if there would be a situation we would view as hazardous, we would come forth.

Mr. FLORIO. How about the specific question we are addressing here today? In that context, have you made any recommendations to DOT on the alternative routing proposals?

Mr. HOOVER. Other than participation in analyses of the safety of shipments by alternative routes, we believe that the structure of using the interstate route structure is an adequate route. We have worked with the city of New York to arrive at a routing that was acceptable to the city, given the circumstances that we were in.

Mr. FLORIO. So it is not your understanding then, that you regard your agency, DOE, as being required to make any formal or informal proposals to DOT in the routing question?

Mr. HOOVER. I think only if we had a serious reservation about the safety of any particular route, and then I think it would be incumbent upon us.

Mr. FLORIO. That is helpful to us because if we are talking about reviewing the statute, it may very well be that we don't want to leave it to your discretion or inclination to make a recommendation. We may want to rule you in as part of the process to require you to make judgments and then share those judgments with DOT to utilize the expertise that you have in this field.

There are no further questions, and we will excuse both our witnesses.

Thank you very much.

[The following information was submitted for the record:]

SUBCOMMITTEE ON COMMERCE, TRANSPORTATION AND TOURISM
OF THE COMMITTEE ON ENERGY AND COMMERCE

## Hearing on the Shipment of Radioactive Waste

August 1, 1985

Written Questions Submitted by the Minority Staff to the Department of Energy:

Question:

What is being shipped from BNL, and could it release gaseous radioactive materials?

Answer:

The MTR fuel such as that being shipped from the BNL consists of an alloy of highly enriched uranium in aluminum with a thin cladding of aluminum on both sides. Evaluations have shown that the fuel, in a credible accident, would not be damaged nor could a criticality problem exist. The fuel is in a solid form and in case of the breach of cask seals no fission products or fuel would be released. Under fire conditions, the fuel would not begin to outgas until the melting point of aluminum (about 1200°F) is reached. Thermal studies on the MH-1A have shown that the temperature of the fuel in a 1475°F fire would be less than the melting point of lead (about 600°F); therefore, there would be no outgassing of the fuel.

Question:

Why is the DOE continuing the shipments if there is plenty of onsite storage available at Brookhaven? How much fuel storage space is presently available?

Answer:

The DOE does not believe continued storage of spent fuel at the BNL facility is a viable option. This spent fuel contains materials that represent a Government investment of about $9 million and should be made available to the Department to assure cost effective use of Federal resources. The relative risks associated with transporting this spent fuel by highway have been exhaustively studied by the DOT and the NRC with the conclusions that such risks are extremely low. We have the utmost confidence that these shipments can be carried out without significant risk to the health and safety of the public. Therefore, we see no inherent benefits in further delaying shipping. There is about 2 years of storage space presently available at Brookhaven.

Question:

What are the risks of transportation of spent fuels through high density metropolitan areas?

Answer:

In a study conducted by Sandia National Laboratory ("The Environmental Consequences of the Transportation of Radioactive Materials in Densely Populated Urban Areas," NUREG/CR-0743, July 1980), the boroughs of Manhattan, Brooklyn, and Queens in New York City were used as a base case (11 to 12 shipments per year) and the estimated risks are as follows:

> The results were expressed as expected numbers of health effects per shipment year. For the base case, they estimated a 1/500,000 yearly likelihood of one early morbidity, a 1/1,000 yearly likelihood of one latent cancer fatality, and 1/1,000 yearly likelihood of a genetic effect. These estimates are consistent with the previous NRC study titled "Final Environmental Impact Statement on the Transportation of Radioactive Materials by Air and Other Modes," NUREG-0170. New data indicates that these estimates may be over conservative.

Question:

Beginning on January 21, 1985, the DOE began shipping spent nuclear fuel from its Brookhaven National Laboratory through the City of New York--our nation's most densely populated area. In view of the Arthur D. Little, Inc., study that concluded that there are at least three safer routes, why has the DOE chosen not to use one of the alternate routes?

Answer:

We have worked closely with New York City officials regarding a preferred interstate highway route to use on these shipments. Alternate routes not on the interstate highway system would need to be determined by a routing agency. I understand that none of the recommended routes examined in the Arthur D. Little study have been designated for use at this time. It should also be noted that other technical reviews, including Sandia National Laboratory, Battelle Northwest Laboratory, and Brookhaven National Laboratory have found deficiencies in the A. D. Little study which lie at the heart of the relative risk determination.

Question

Why doesn't the DOE use only NRC-certified packagings for transporting RAM?

Answer:

The DOE has packaging certification authority which derives from the Atomic Energy Act and subsequent acts. This enables the DOE to meet its many diverse program commitments in a timely manner for those activities not subject to licensing by the NRC. The DOT regulation 49 CFR 173.7(d) requires that DOE-approved, and certified by the DOE against packaging standards equivalent to those specified in 10 CFR Part 71." An outline of the DOE packaging certification procedures is attached. The excellent shipping record of the DOE with regard to the safe transport of radioactive materials is indicative of the strength of the DOE certification program for radioactive material packagings. A recent survey has shown that converting to an all NRC-certified cask packaging fleet for DOE shipment operations would be extremely burdensome without any known safety benefit.

Question:

Has the DOE considered routes other than truck that poses less risk around the densely populated areas of New York City?

Answer:

During the shipment planning stages, the DOE worked closely with City officials to determine their desires in routing the Brookhaven spent fuel traffic. Use of a partial water route across to Connecticut was one of the City's suggestions, but it was necessary for the DOE to assure that the route used met with the DOT's highway routing rule HM-164. That rule dictates the use of the interstate highway system or alternates designated by a State routing agency. No approved alternate was then, or is now, available to the DOE for these shipments. Further, the State of Connecticut has strongly opposed the use of waterborne routing through their State.

Question:

Why is DOE reluctant to ship the BNL spent fuel via barge?

Answer:

The closest facility on Long Island which could accommodate a barge is located at Orient Point, New York. Interstate 495 extends out Long Island only as far as Orient Point, New York. From Riverhead to Orient Point is approximately 33 miles of two-lane State highways. Assuming the State of Connecticut would not take the legal actions they have proposed to block these shipments, the barge would dock at New London, Connecticut, and the shipments would then traverse approximately 4 miles of city streets to reach I-395. This circuitous route, in conjunction with the delays associated with loading and unloading the barge, increases the transit time with no safety benefits to the general public.

Question:

What, in the DOE's opinion, would be the worst-case scenario in terms of health and property damage if there were an accident along the New York City route and radioactive contamination occurred? What evidence does the DOE rely on to reach such conclusions.

Answer:

The DOE and the NRC postulated a series of independent tests that went far beyond any credible accident. This was a malevolent attack on a spent fuel cask with high explosives. The worst case dispersion of fuel amounted to 31 grams total. Even in this test, which went far beyond any credible accident, the dispersion of materials in respirable form was found to cause only one latent cancer fatality. In other words, a worst-case accident scenario and loss of some radioactivity would possibly add one latent cancer fatality in New York City. I understand the cancer fatality rate in New York City is now running at about 15,820 per year (source: "Cancer Statistics 1985," published by the American Cancer Society Vol. 35, No. 1, Jan/Feb 1985).

Question:

Current Federal policy simply seeks to promote an acceptable level of safety. Why is it not promoting an optimum level of safety?

Answer:

DOE believes the stringent packaging and transportation regulations promulgated by DOT and NRC provides a near optimum level of safety when compared to other societal risks.

In a study conducted by Sandia National Laboratory ("The Environmental Consequences of the Transportation of Radioactive Materials in Densely Populated Urban Areas," NUREG/CR-0743, July 1980), the boroughs of Manhattan, Brooklyn, and Queens in New York City were used as a base case (11 to 12 shipments per year) and the estimated risks are as follows:

The results were expressed as expected numbers of health effects per shipment year. For the base case, they estimated a 1/500,000 yearly likelihood of one early morbidity, a 1/1,000 yearly likelihood of one latent cancer fatality, and 1/1,000 yearly likelihood of a genetic effect. These estimates are consistent with the previous NRC study titled "Final Environmental Impact Statement on the Transportation of Radioactive Materials by Air and Other Modes," NUREG-0170. New data indicates that these estimates may be over conservative.

These statistics compare to a present annual cancer fatality rate in New York City of approximately 15,820 from other sources.

Question:

Why does the DOE continue to use packagings for radioactive material which have outstanding NRC technical questions?

Answer:

In 1981-1982, several DOE Safety Analysis Reports for Packagings (SARP) were sent to NRC as a "general request for technical comments" (then the DOE procedure). Due to the increased workload imposed upon the NRC staff by mutual NRC/DOE consent, that procedure was changed in 1983. It was mutually determined at that time that SARP's would not be sent to NRC for review unless an NRC certificate of compliance was needed by an NRC licensee for a DOE package or for other programmatic reasons. Technical discussions between the two agencies on these packagings have been concluded. There are no unanswered questions that would impact margins of safety.

WANG 0902o
August 5, 1985

Mr. **Florio**. We are now pleased to have the Honorable Joseph Lieberman, attorney general, State of Connecticut and the commissioner of New York City Department of Environmental Protection, the Honorable Joseph McGough, Jr.

We appreciate your patience through the long hearing.

Mr. Attorney General.

## STATEMENTS OF JOSEPH I. LIEBERMAN, ATTORNEY GENERAL, STATE OF CONNECTICUT; AND JOSEPH T. McGOUGH, JR., COMMISSIONER, NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Mr. **Lieberman**. Thank you, Mr. Chairman, and Congressman Scheuer. I am Joseph Lieberman, attorney general, State of Connecticut. Thank you for the opportunity to appear before you and may I, as a former legislator in Connecticut, congratulate you on your patience and stamina here this morning.

I submitted testimony for the record, and I will not read it, but I do want to make a few comments extracted from it and pick up a few threads that have emerged here this morning.

Mr. Chairman, as you quite rightly said earlier in the morning, this is a local conflict, but it has very important national implications. I find myself as a State attorney general on a rather unusual side. It is my reflex normally to be a defender of states rights, of federalism, and of the important role for the States in asserting their authority, but it seems to me also, that this is a classic situation demanding a national solution, or there will be inaction. I must say that I have admiration for Congress in adopting the original HMTA which was an assertion of that national leadership.

The kind of problem that would exist without national leadership in a very real sense has been demonstrated to you here this morning.

I will do all that I can to advocate the interests of the people of Connecticut, and to protect their safety.

Representatives of the State of New York will clearly and rightfully do the same, and if we leave it to that without overriding national processes, we will have no solution and no movement. It reminds me of that old line that everybody wants to go to heaven but nobody wants to die. In this case, everybody wants to enjoy the benefits of nuclear technology, in commerce and business and health care and research, but ultimately none of us wants to bear the burden of having that material transported across our State. That is why HMTA was passed and why the fundamental Federal DOT plan as carried out in HM-164 is sound.

Let me make just a very few comments about the dispute that exists between Connecticut and our friends in New York. We understand the essence of their argument is that they have more people in New York; that clearly is acknowledged.

We understand also that they argue that they are especially unique because they have no beltway around the city, but what they are asking of Connecticut is unfair, Mr. Chairman. May I say in the frankest terms possible, Connecticut is not prepared to become the beltway for the Big Apple. We feel no responsibility in law or equity to assume that role.

We have assumed more than our fair share of the transport of nuclear waste. In fact, in Connecticut, every year more than 900 permits are issued by our State for the transport of nuclear waste across the State and an awful lot of it comes from outside of Connecticut, from the northern New England States, who have to send the material through Connecticut to get to disposal sites in the West.

New York City has a direct route. It is a route that is ordained by the existing Federal system. It is direct and they do not have to send their material through Connecticut and that is why we don't want to accept it.

Congressman Scheuer has focused on the A.D. Little report; we have had something of a battle of consultants here. In the first A.D. Little report, they suggested that the Connecticut alternative, Orient Point to New London was 9 percent safer. Our consultant came back and said A.D. Little had failed to consider the risk to the drivers and others who will come in contact with this shipment over the longer transport across Connecticut. A.D. Little essentially went back and redid their report and came up with the 32 percent and I am very skeptical, I must say respectfully, of these findings.

I also note that nowhere in the Little report is there a risk factor attached to the transport across Long Island Sound, which we take very seriously and in fact, Mr. Chairman, the U.S. Coast Guard has filed statements in the proceedings before the DOT opposing the Long Island Sound alternative, because of the potential risk to the sound, because contrary to what was said earlier here today, barges do sink, and accidents do occur on the sound and the impact and the result of that kind of accident could be disastrous.

Members of Congress have commented briefly this morning on bills that they have submitted. Congressman Green and Congressman Weiss particularly, and Congressman Biaggi. On behalf of Connecticut, we have no opposition to Congressman Biaggi's approach, because it would protect us from having any waste go across as well, but it would frustrate the possibility of any nuclear waste traveling in the country.

Congressman Green's proposal for environmental impact statements again conceptually does not draw opposition but it would create such a layer of extra bureaucracy that in our opinion it would make it effectively impossible to transport radioactive waste, in a timely fashion.

Mr. Weiss' proposal, I think, would do great danger to this problem because, in changing the burden of proof, and putting it on the Federal Government instead of on the localities, it would be an invitation to parochialism, the kind that would irresistably be accepted, and that would close down the national transport of radioactive waste, and to say the least, would interfere with interstate commerce.

Mr. Chairman, the long and the short of it is that I appreciate your interest in this subject, and the time the committee has given to it. I am not here to say the current state of law or Federal regulations is beyond improvement but in my opinion, the basic delegation of authority here in this area is appropriate as it exists under current law and I would respectfully ask the committee to tread very cautiously before making any substantial change in current law that would give the localities more independent authority to turn back the transport of radioactive waste.

I will submit, along with my testimony, copies of all the papers that we have given to the DOT and again, I thank you for this opportunity to testify.

[The prepared statement of Mr. Lieberman follows:]

# TESTIMONY

# OF

# JOSEPH I. LIEBERMAN
# ATTORNEY GENERAL OF CONNECTICUT

Mr. Chairman, Honorable Members, I am Joseph Lieberman, Attorney General of the State of Connecticut. Since last December, when I first learned about it, I have fought New York City's plan to divert shipments of nuclear waste from Brookhaven National Laboratories on Long Island through the State of Connecticut.

In Connecticut, over the past few years, I have produced an educational program called, "the law in plain language." So, today, I'd like to cut through some of the technical jargon and talk about the issues of nuclear waste transportation in plain language.

First, we must recognize that the chance of an accident happening that results in exposure to the public is minute. If an accident ever does occur, the potential for severe damage to people and the environment is certainly there. But we must not misrepresent the risk. Nuclear waste is transported routinely over our roads to disposal sites, and it is extremely unlikely that disaster will occur.

If the odds of such an accident occurring were not minimal, then we wouldn't be here today debating how to choose the best route -- we would be arguing against any production or transportation of nuclear waste to begin with.

Having said that, we are left with this question: over what roads does the waste travel? The U.S. Department of Transportation has been very clear on this. Nuclear waste should travel on direct routes to disposal sites, most often using interstate highways. Diversion around densely populated areas should occur when interstate systems include a bypass, or beltway around a city.

I know a lot of people think of Connecticut as a suburb of New York City. But we're not a beltway for the Big Apple. It doesn't make sense for the nuclear waste from Brookhaven, Long Island, to come our way. The shortest distance between New York and Idaho is not through Connecticut.

When you first hear New York's argument, it has an appealing simplicity to it: we're a very big city, they say, and we just don't want nuclear material coming through our streets. Why not send this awful stuff through nice, rural Connecticut?

But that's not as benign a suggestion as it first appears. First, they propose that the nuclear waste be put on barges or ferries and shipped over Long Island Sound. We're proud of the Sound; we know there is some risk involved in putting the waste onto barges and sending it over this beautiful body of water to our ports. New York doesn't want to even consider that risk. Second, New York's plan calls for sending the waste through towns and cities in Connecticut with a combined population of more than 1,000,000 people; it would go through the heart of some of our larger cities -- Bridgeport, Hartford and Waterbury. That is not unpopulated, rural countryside.

But, New York's consultants argues that it's safer to send this material through Connecticut. Well, we hired a consultant of our own -- the Energy Research Group of Waltham, Massachusetts, and they found serious flaws in New York City's study. In fact, they concluded that it was clearly safer to send the stuff through the City, and not through Connecticut -- even without considering the additional risk of transit over Long Island Sound.

The key to this dispute is the meaning of the work "risk". As I have said, the potential for a major catastrophe is extremely small -- I don't want it to happen anywhere, Connecticut, New York or Idaho. But there's another risk -- the risk of exposure to radiation through proximity to the material. Despite the fact that the state-of-the-art casks protect the material from accidental damage, you can't really prevent all leakage. The driver, for example, will receive some radiation. And the longer you expose the driver and others on the truck to that dosage, the greater the danger will be to them. Clearly, diverting the waste material over Long Island Sound and up through Connecticut will increase the time and distance of the trip to Idaho, and will definitely increase the risk to the drivers, and all others involved in the actual transportation.

So we in Connecticut are talking about a real risk. It's a risk that cuts the heart out of New York's proposal, and gives, we believe, the U.S. Department of Transportation an excellent reason to reject New York's request.

Just because we're against the New York City plan doesn't mean we're being parochial. We are willing to do our part. Nuclear waste does regularly travel our roads. We produce some of our own, and we readily accept waste from northern New England states, recognizing that the best route for that waste to take is on interstates through Connecticut. This is not a 'not in my backyard' argument we are making.

I believe you, as a committee of the House of Representatives, recognize this. And I do believe you recognize the larger issue at stake here. Were this just a border war between New York and Connecticut, it is unlikely we would be here today. We had a tussle with Massachusetts over the disposal of sewage into our Connecticut River that didn't involve congressional oversight. We also had a bit of a battle with New York two years ago when the Mianus River Bridge collapsed and traffic was diverted through New York communities. That, too, was resolved by mediation at the local level.

There's a national component to this argument. If New York City were to win -- if they were successful in diverting this waste through our state -- we could see the beginning of a domino effect.

One by one cities that nuclear waste travels through would take heart from the New York example and try to get themselves exempted from the route. They would say to themselves, "why, we're a big city too, and why don't they just take that stuff out around those rural areas to our north, or south, and leave us safe and alone?" Given the New York precedent, it would be hard for the U.S. Department of Transportation, or the courts, to resist. And we'd end up with a crazy-quilt pattern, one that results in a substantial increase in time of travel, and an increase in distance, and economic cost. And, it would result in a greater risk -- a greater risk to the transporting workers and to the public. The longer the waste is on the roads, the greater the dose received by the drivers, and the greater the opportunity for accidents, or, God forbid, for hijackings.

Mr. Chairman, I am enclosing with my testimony a copy of our brief as it was filed with the U.S. Department of Transportation, outlining our objections to New York's proposal in greater detail. I am also enclosing a copy of the Energy Research Group report that rebuts New York's Arthur D. Little study. I hope these are helpful to you, and I would be glad to answer any questions you might have.

Thank you.

State of Connecticut

JOSEPH I. LIEBERMAN
ATTORNEY GENERAL

Office of The Attorney General
30 TRINITY STREET
HARTFORD 06106

April 8, 1985

## SUMMARY OF CONNECTICUT'S COMMENTS TO NEW YORK CITY'S APPLICATION FOR NONPREEMPTION DETERMINATION TO BAN THE SHIPMENT OF SPENT NUCLEAR FUEL THROUGH THE CITY

I. New York City has failed to demonstrate that its health code regulation, banning the shipment of spent nuclear fuel through New York City, will afford the public an equal or greater level of protection than the federal regulations establishing preferred routes for such shipments.

A. New York City's proposal, to ship this material across Long Island Sound and then through Connecticut, will pose a greater danger to the public than shipping through New York City.

1. New York City's study by Arthur D. Little, Inc. (the ADL Report), in support of its application failed to consider the occupational risk to the drivers exposed to the radioactive material in calculating public risk in normal (non-accident) transit.

2. The ADL Report used an inappropriate common meeting point when comparing the risk to the public of the route through New York City and the route through Connecticut.

3. Shipping spent nuclear fuel through Connecticut will increase the risk to the public by 40% compared to shipping the more direct route through New York City.

B. At the very least, the ADL Report does not substantiate that shipping through Connecticut will afford the public an equal or greater level of protection than shipping under federal regulations along the preferred route through New York City.

1. The ADL Report ignores any risk to the public resulting from transporting across the Long Island Sound.

2. The ADL Report fails to consider a number of important factors, such as seasonal variations in population, and varying traffic levels at different hours of the day, which affect the reliability of ADL's calculations of risk.

3. The margin of error in ADL's analysis is larger than the results obtained.

II. New York City's regulation restricting the highway transport of spent nuclear fuel unreasonably burdens interstate commerce.

A. New York City's requirement would result in increased cost and will impair the efficient transport of these materials.

1. New York City's proposal would require the spent fuel to travel longer distances, additional miles on non-interstate roads and with a greater risk of accident.

2. Shipping by ferry creates additional problems and the possibility of delays in transit.

B. New York City's regulation has little rational basis.

1. While New York City is admittedly densely populated, it is not the only large city without a bypass or beltway. (See, for example, Hartford)

2. New York City's fear of catastrophic nuclear accident was not based on any scientific studies of this risk; most recent reports confirm that the risk (probability and consequences) of an accident in the heart of New York City is minimal. Moreover, there is no record of an accident involving nuclear exposure in the U.S.

3. New York City's adoption of this regulation was also based on a desire to block the air shipments of nuclear fuel by preventing the fuel from arriving at or leaving Kennedy Airport; however, spent fuel may no longer be transported by air.

C. New York's requirement does not achieve its stated purpose.

1. Other radioactive materials are presently transported through New York City.

2. Large quantities of highly dangerous non-radioactive materials are also allowed to be shipped through New York City.

D. There is an urgent need for uniformity in the shipment of nuclear fuel.

1. The transportation and disposal of spent nuclear fuel is a problem of national public policy, requiring all states and municipalities to assume their fair share of responsibility.

2. Many other jurisdictions already have restrictions and bans on the transport of nuclear material; if New York City's application is granted, the effect will be to encourage such bans. USDOT has indicated that "the proliferation of independently enacted restrictions would lead to the type of regulatory balkanization which Congress sought to preclude by enacting the Hazardous Materials Transportation Act."

3. New York City is shifting its responsibility to Connecticut and thus conflicting with Connecticut's efforts to do its fair share. Connecticut is not trying to insulate itself from the responsibilities of nuclear waste disposal, and in fact, accepts large numbers of shipments of radioactive materials.

Mr. **Florio**. Commissioner McGough.

### STATEMENT OF JOSEPH T. McGOUGH

Mr. **McGough**. I want to thank you for this opportunity to present New York City's position on the transport of nuclear wastes through the city. We support a Federal regulatory program which has as its primary objective the maximization of public safety and the selection of the safest routes for the shipments of spent fuel. We believe it is foolish for the Federal Government to accept what is claimed to be an adequate level of safety, when great safety can be achieved through the use of routes which avoid the Nation's most densely populated cities. It is for this reason that we have long been opposed to and have sought to prevent shipments of spent nuclear fuel through the city of New York.

I think that several of the congressional Members who have testified before you earlier today have put their finger, as has my colleague from Connecticut—the Attorney General—that the issue here is whether or not the Hazardous Transportation Act is for the facilitation of commerce or is an act, as has been described by Congressman Weiss as he believes—and we do in the city—one to promote the safety. And I think that we are in this dispute perhaps—if I can call it that—with our neighboring State perhaps because there is some lack of procedure that could be, by your committee, put into the act that would not pit one State against another, and this is precisely what we had in mind and is the reason why we sued in the first place.

That was, we very much objected to the fact that under rule 164, the Transportation Department did not have to consider alternate modes of transport at all, they merely had to consider, according to what the courts have upheld, simply highway routes. We believe that when you only considered highway routes and not other modes of transport and leave everything to the waiver process, what happens is that a city like New York City that does have the very dense population, and a unique circumstance, which has been testified to here, you have an alternative but to go into that proceeding and shift that route—and in New York City's case—there is no other way to get off Long Island and avoid the city of New York without going through Connecticut, a neighboring State, and therefore, we have been put into this circumstance of dispute with Connecticut, perhaps through some inadequacy in the original law. And if that law had required the Department of Transportation to consider alternate routes and they had made their decision based upon least risk, we wouldn't be here, and this dispute would not have come this far.

Mr. **Florio**. I think that is a very important point.

Mr. **McGough**. I think really all my remarks have been testified to. My staff was the source of much of the other Member's comments. But there is one thing I would like to touch on and that is, these two graphs that I have presented over here which demonstrate, yes, density of population is the key to New York City's problem, and it is. If there are any benefits to New York City, which I also agree with Congressman Biaggi, we do not have any direct benefits any more than anywhere else, then there are also considerable costs associated with density of population and Connecticut wouldn't be willing to take on all those costs.

The red areas indicate density of population. First of all, the route through dense populations in Connecticut is 4 miles, whereas in New York City's current route it is 8 miles, which goes through 11 areas that have densities of population over 20,000 persons per square mile, whereas in Connecticut's case there are only 2 such areas within 1 mile of the route.

The city indeed, the population, exposed in the entire State of Connecticut is just over 1 million. Whereas, in the case of the city of New York, excluding the other areas of New York City, there are over 3 million, so there is a very great difference in the population densities exposed, and that is the primary reason that we have brought our case before the DOT.

I also want to just comment. In connection with my submission of my remarks, there is an affidavit by a transportation expert employed by the Federal Government, which states that New York City is indeed unique and that it is the only population center in the country that has a population density of over 20,000 persons per square mile, which does not have a circumferential or other beltway around it. Therefore, it is based upon this affidavit, submitted in 1982—that we believe a very unique situation does exist that does need to be addressed through the process of a nonpremption determination.

For this reason I see no flood of other cities coming to the Federal Government, because even if New York City were able to make out its case, as I believe it should be found in our favor, there is virtually no other city in the whole country that has the population densities that we have to struggle with.

I appreciate your patience in hearing all of us on this very important issue and I look forward to working with your committee as the reauthorization of the Hazardous Materials Transportation Act comes along, because I do think from this experience we have some issues that we can address to help the rest of the Nation not fall into this problem.

[Testimony resumes on p. 229.]

[The prepared statement of Mr. McGough follows:]

# TESTIMONY OF JOSEPH T. MCGOUGH, JR.
COMMISSIONER OF THE NEW YORK CITY DEPARTMENT
OF ENVIRONMENTAL PROTECTION
BEFORE THE SUBCOMMITTEE ON
COMMERCE, TRANSPORTATION, AND TOURISM
OF THE HOUSE COMMITTEE ON ENERGY AND COMMERCE

AUGUST 1, 1985

MR. CHAIRMAN AND DISTINGUISHED MEMBERS OF THE COMMITTEE, THANK YOU FOR THIS OPPORTUNITY TO PRESENT THE CITY OF NEW YORK'S POSITION ON THE TRANSPORT OF NUCLEAR WASTE THROUGH THE CITY.

WE SUPPORT A FEDERAL REGULATORY PROGRAM WHICH HAS AS ITS PRIMARY OBJECTIVE THE MAXIMIZATION OF PUBLIC SAFETY THROUGH THE SELECTION OF THE SAFEST ROUTES FOR THE SHIPMENT OF SPENT FUEL. WE BELIEVE IT IS FOOLISH FOR THE FEDERAL GOVERNMENT TO ACCEPT WHAT IS CLAIMED TO BE AN ADEQUATE LEVEL OF SAFETY WHEN GREATER SAFETY CAN BE ACHIEVED THROUGH THE USE OF ROUTES WHICH AVOID THE NATION'S MOST DENSELY POPULATED CITIES.

IT IS FOR THIS REASON THAT WE HAVE LONG BEEN OPPOSED TO AND HAVE SOUGHT TO PREVENT SHIPMENTS OF SPENT NUCLEAR FUEL THROUGH THE CITY. A LOCAL ORDINANCE PROHIBITED TRANSPORTATION THROUGH THE CITY OF NEW YORK FROM 1976 UNTIL THE U.S. DEPARTMENT OF TRANSPORTATION EFFECTIVELY OVERRULED IT WITH THE PASSAGE OF HM-164, A FEDERAL REGULATION WHICH PREEMPTED STATE AND LOCAL PROHIBITIONS ON THE HIGHWAY TRANSPORT OF SPENT FUEL.

THE CITY CHALLENGED HM-164 ON THE GROUNDS THAT IT WAS IMPERMISSIBLE FOR DOT TO RELY UPON HIGHWAY TRANSPORT OF SPENT FUEL WHEN ALTERNATIVES, SUCH AS BARGING, OFFERED A MEANS OF BY-PASSING DENSELY POPULATED AREAS AND HAD YET TO BE EXPLORED. ALTHOUGH THE FEDERAL DISTRICT COURT BELIEVED, AS WE DO, THAT DOT WAS REQUIRED TO MAKE THIS COMPARISON AND CHOOSE THE SAFEST OPTION, THE APPEALS COURT DISAGREED AND LAST FEBRUARY, THE SUPREME COURT EFFECTIVELY REMOVED THE FINAL LEGAL OBSTACLE PREVENTING BROOKHAVEN NATIONAL LABORATORIES FROM TRUCKING THEIR STOCKPILE OF SPENT FUEL THROUGH THE CITY.

AS A RESULT OF THE SUPREME COURT'S DECISION, THE CITY HAS BEEN PURSUING THE "NON-PREEMPTION DETERMINATION" PROCESS BEFORE DOT. THIS PROCESS REQUIRES DOT TO ALLOW THE CITY'S PROHIBITION ON HIGHWAY TRANSPORT TO STAND IF WE CAN DEMONSTRATE THAT: 1) THE LOCAL RULE IMPOSES NO UNREASONABLE BURDEN ON INTERSTATE COMMERCE; AND 2) PROVIDES AN EQUAL OR GREATER LEVEL OF SAFETY THAN DOES THE FEDERAL RULE.

AS PART OF THE APPLICATION PROCESS, THE CITY COMMISSIONED A STUDY BY THE FIRM OF ARTHUR D. LITTLE, INC. (ADL), A RECOGNIZED EXPERT IN THE FIELD OF TRANSPORTATION AND RISK ANALYSIS, OF ALL VIABLE OPTIONS TO THE HIGHWAY SHIPMENT OF SPENT REACTOR FUEL THROUGH THE CITY OF NEW YORK.

THE ADL STUDY FOCUSED ON THE SHIPMENT OF SPENT REACTOR FUEL FROM BROOKHAVEN NATIONAL LABORATORIES, ON EASTERN LONG ISLAND TO A FEDERAL REPOSITORY IN IDAHO, AND EXAMINED FIVE ALTERNATIVES TO HIGHWAY SHIPMENT THROUGH THE CITY. FOUR OF THE ALTERNATIVES INVOLVED WATERBORNE SHIPMENTS FROM LONG ISLAND TO CONNECTICUT, WHILE THE FIFTH WOULD BARGE SHIPMENTS TO NORFOLK, VIRGINIA.

EACH OF THESE ALTERNATIVES WAS ANALYZED ACCORDING TO THE U.S. DEPARTMENT OF TRANSPORTATION'S METHODOLOGY FOR SELECTING THE SAFEST ROUTE WHICH SETS FORTH BOTH "PRIMARY" AND "SECONDARY" ROUTE COMPARISON FACTORS. THE THREE PRIMARY ROUTE COMPARISON FACTORS ARE:

1. NORMAL EXPOSURE - THE RADIATION EXPOSURE OF PEOPLE DURING NORMAL TRANSPORT (i.e., NO ACCIDENT) OF THE PACKAGE.
2. HEALTH RISK - THE RISK OF POPULATION EXPOSURE TO RADIATION FROM OCCURRENCE OF AN ACCIDENT.
3. ECONOMIC RISK - THE COST OF DECONTAMINATION OF PROPERTY AFFECTED BY AN ACCIDENTAL RELEASE.

UNDER THE DOT METHODOLOGY, WHERE TWO ROUTES ARE JUDGED COMPARABLE ON THE BASIS OF THE PRIMARY FACTORS, SECONDARY FACTORS ARE ALSO CONSIDERED. THEY INCLUDE:

- EMERGENCY RESPONSE EFFECTIVENESS
- EVACUATION CAPABILITIES
- LOCATION OF SPECIAL FACILITIES SUCH AS SCHOOLS OR HOSPITALS
- TRAFFIC FATALITIES AND INJURIES UNRELATED TO THE RADIOACTIVE NATURE OF THE CARGO

UTILIZING THE "PRIMARY ROUTE" COMPARISON FACTORS, ADL DETERMINED THAT FOR AN ADDITIONAL EXPENDITURE OF FROM $1200 TO $2000 PER TRIP -- A MINISCULE COST INCREASE CONSIDERING THAT THE VALUE OF EACH SHIPMENT IS IN THE MILLIONS -- A 4% TO 9% REDUCTION IN RISK COULD BE ACHIEVED BY USING EITHER THE EXISTING FERRY FROM ORIENT POINT, LONG ISLAND TO NEW LONDON, CONNECTICUT OR A CHARTERED FERRY FROM PORT JEFFERSON, LONG ISLAND TO BRIDGEPORT, CONNECTICUT.

AT THE REQUEST OF THE U.S. DEPARTMENT OF TRANSPORTATION, CITY OFFICIALS APPEARED AT A CONFERENCE IN NEWINGTON, CONNECTICUT ON FEBRUARY 14, 1985 TO BRIEF CONNECTICUT OFFICIALS ON THE CONTENTS OF THE CITY'S APPLICATION. IN RESPONSE TO THE CITY'S APPLICATION, COMMENTS WERE SUBMITTED BY CONNECTICUT RESIDENTS, PUBLIC INTEREST GROUPS, CONNECTICUT STATE AND LOCAL OFFICIALS AND OTHERS WHO CLAIMED THAT THE ADL STUDY DID NOT CONCLUSIVELY DEMONSTRATE A SAFER ROUTE.

AS A RESULT OF THESE COMMENTS, THE CITY SUBMITTED A SUPPLEMENTARY REPORT WHICH SHOWS THAT:

A) ON THE BASIS OF A MORE PRECISE AND DETAILED COMPARISON OF THE "PRIMARY RISK COMPARISON FACTORS", ALTERNATIVE 3 (THE ROUTE THROUGH CONNECTICUT UTILIZING THE ORIENT POINT - NEW LONDON FERRY) IS 32% SAFER THAN ALTERNATIVE 1 (THE ROUTE THROUGH THE CITY), AND

B) USING "SECONDARY RISK COMPARISON FACTORS" WHICH COMPARE EVACUATION CAPABILITIES, EMERGENCY RESPONSE, AND POPULATION DENSITY ALONG BOTH ROUTES, ALTERNATIVE 3 (THE ROUTE THROUGH CONNECTICUT) IS 15% SAFER THAN ALTERNATIVE 1 (THE ROUTE THROUGH THE CITY).

IN ADDITION TO USING THE PRIMARY AND SECONDARY ROUTE COMPARISON FACTORS, ADL ALSO FOCUSED ON THE SO-CALLED "WORST CASE" EVENT.

AS WE KNOW THE TRUCK ROUTE THROUGH THE CITY INVOLVES TRANSPORT BY EXPRESSWAY THROUGH THE BOROUGHS OF QUEENS AND THE BRONX, AND THEN NORTH THROUGH WESTCHESTER AND BEYOND. A RADIOACTIVE MATERIALS INCIDENT ANYWHERE ALONG THE CITY ROUTE COULD CONCEIVABLY REQUIRE THE PRECAUTIONARY EVACUATION OF TENS OF THOUSANDS OF PEOPLE FROM THE MANY SCHOOLS, HOSPITALS, AND HIGH-RISE APARTMENT BUILDINGS AND OTHER SPECIALIZED FACILITIES ALONG THE ROUTE, INCLUDING LA GUARDIA AIRPORT AND THE OVER 60,000 RESIDENTS OF CO-OP CITY, A MERE STONE'S THROW FROM I-95 IN THE BRONX.

EVEN THOUGH THE PROBABILITY AND CONSEQUENCES OF INCIDENTS IN A POPULATION ZONE OF THIS DENSITY CANNOT BE PREDICTED WITH ANY DEGREE OF CERTAINTY, IT IS UNDENIABLE THAT A ROUTE WHICH EXPOSES A SIGNIFICANTLY GREATER NUMBER OF PERSONS TO RADIOLOGICAL RISK IN THE EVENT OF A SERIOUS ACCIDENT IS THE LEAST DESIRABLE ALTERNATIVE.

IN CONTRAST TO THE TOTAL NUMBER OF PEOPLE EXPOSED IN THE 32 CONNECTICUT MUNICIPALITIES THROUGH WHICH THE SHIPMENTS WOULD TRAVEL (i.e. 1,120,362), THE ROUTE THROUGH THE CITY ALONE WOULD EXPOSE A POPULATION OF 1,896,950 IN THE BOROUGH OF QUEENS AND 1,170,391 IN THE BOROUGH OF THE BRONX, OR ALMOST TWO MILLION MORE PEOPLE THAN THROUGH THE ENTIRE STATE OF CONNECTICUT!

MOREOVER, IF AVERAGE POPULATION DENSITY IS USED AS THE YARDSTICK, THE POPULATION DENSITY OF THE BOROUGH OF THE BRONX (25,094 PEOPLE/SQUARE MILE) IS MORE THAN THREE TIMES THAT OF THE CITY OF HARTFORD (7,373 PEOPLE/SQUARE MILE) AND THE AVERAGE POPULATION DENSITY OF THE BOROUGH OF QUEENS (16,455 PEOPLE/SQUARE MILE) IS MORE THAN TWICE THAT OF HARTFORD.

AS CAN BE SEEN ON THE DISPLAY CHART, IF THE POPULATION DENSITY WITHIN ONE MILE OF THE HIGHWAY ALONG THE MOST DENSELY POPULATED SEGMENTS OF THE ROUTES THROUGH CONNECTICUT AND NEW YORK ARE COMPARED, THE RESULTS SHOW THAT THE CITY OF HARTFORD HAS ONLY TWO LOCATIONS WITHIN ONE MILE OF THE ROADWAY WHERE THE POPULATION DENSITY EXCEEDS 20,000 PERSON PER SQUARE MILE AS COMPARED TO 13 LOCATIONS ALONG THE ROUTES THROUGH THE BRONX AND QUEENS.

THUS, BY ANY MEASURE OF COMPARISON, THE ROUTE THROUGH THE CITY EXPOSES A SIGNIFICANTLY GREATER NUMBER OF PERSONS TO RADIOLOGICAL RISK IN THE EVENT OF A CATASTROPHIC ACCIDENT THAN WOULD BE THE CASE IF THE ROUTE THROUGH CONNECTICUT WERE USED.

ALTHOUGH CONNECTICUT HAS QUESTIONED THE MOTIVES BEHIND THE CITY OF NEW YORK'S APPLICATION, AND CONTENDS THAT THE CITY IS SIMPLY ATTEMPTING TO SHIFT THE BURDEN OF TRANSPORT FROM ITS BACKYARD TO THAT OF ITS NEIGHBORS, THIS IS NOT THE CASE.

THE CITY'S APPLICATION IS FOUNDED UPON AN EXPERT ANALYSIS IN CONFORMITY WITH DOT GUIDELINES AND IS INTENDED TO INSURE ONLY THAT OVERALL RISK IS MINIMIZED, AND THAT A RATIONAL PROCESS IS EMPLOYED IN ROUTING THE SPENT FUEL.

THE CITY OF NEW YORK IS UNIQUE IN THAT NOT ONLY IS IT THE MOST DENSELY POPULATED CITY IN THE NATION, BUT IT IS ALSO THE ONLY MAJOR POPULATION CENTER IN THE UNITED STATES WITHOUT AN INTERSTATE SYSTEM BYPASS OR BELTWAY FOR SHIPMENTS OF SPENT FUEL EMANATING FROM LONG ISLAND. IF THERE IS ANY DOUBT ABOUT THE CITY'S SPECIAL CIRCUMSTANCES, THE CITY'S EXTREME POPULATION DENSITY AND LACK OF A HIGHWAY BYPASS WERE FACTORS CITED IN A 1982 AFFIDAVIT PREPARED BY LAWRENCE B. SHAPPERT OF OAKRIDGE NATIONAL LABORATORIES AT THE REQUEST OF DOE AND DOT AND SUBMITTED TO JUDGE SOAFER IN CONNECTION WITH DETERMINING THE SCOPE OF THE DISTRICT COURT'S INJUNCTION. THE SHAPPERT AFFIDAVIT, A COPY OF WHICH IS ATTACHED TO MY TESTIMONY, NOTES THAT "... WITH THE EXCEPTION OF NEW YORK CITY, ALL HIGH POPULATION AREAS HAVING A DENSITY IN EXCESS OF 20,000 PERSONS PER SQUARE MILE CAN BE AVOIDED BY THE USE OF ALTERNATIVE HIGHWAY ROUTES OR CIRCUMFERENTIAL BELTWAYS FOR ALL SHIPMENTS ORIGINATING OUTSIDE SUCH POPULATION CENTERS."

WE BELIEVE THAT THE ADL STUDY CLEARLY SHOWS THAT SHIPPING AROUND THE CITY MINIMIZES OVERALL RISK, AND WE URGE A MORATORIUM ON SHIPMENT OF RADIOACTIVE MATERIALS THROUGH NEW YORK CITY UNTIL THE WAIVER PROCESS IS COMPLETED.

WE ALSO BELIEVE THAT INSUFFICIENT ATTENTION HAS BEEN GIVEN TO THE SUBJECT OF CASK SAFETY AND LICENSING. AT PRESENT, THE NUCLEAR REGULATORY COMMISSION LICENSES THE MAJORITY OF CASKS USED TO TRANSPORT SPENT FUEL BUT HAS NO JURISDICTION OVER CASKS USED BY THE DEPARTMENT OF ENERGY FOR ITS SPENT FUEL SHIPMENTS. DOE HAS BEEN USING THE MH-1A CASK TO MAKE NUMEROUS SPENT FUEL SHIPMENTS THROUGH THE CITY, THEREBY CREATING APPROXIMATELY THREE YEARS' WORTH OF STORAGE CAPACITY. SINCE JANUARY 1985, DOE HAS REPEATEDLY ASSURED CITY OFFICIALS OF THE CASKS' SAFETY. YET, WHEN DOE SOUGHT TO HAVE THE MH-1A CASK CERTIFIED BY THE NRC, CERTIFICATION WAS WITHHELD. THE CURRENT CONTROVERSY OVER THE MH-1A CASK RAISES SUBSTANTIAL QUESTIONS ABOUT WHETHER THE FEDERAL GOVERNMENT HAS ACTED RESPONSIBLY IN THIS MATTER AND POINTS UP THE NEED FOR STRICTER REGULATION OF CASK LICENSING.

WE ALSO URGE CONGRESS TO GIVE THOUGHTFUL CONSIDERATION TO BILLS INTRODUCED THIS SESSION BY CONGRESSMAN MARIO BIAGGI, (H.R. 1105) WHICH WOULD BAN SHIPMENT OF NUCLEAR WASTE THROUGH LARGE CITIES AND BY CONGRESSMAN BILL GREEN (H.R. 2938) WHICH WOULD PROHIBIT SHIPMENT OF NUCLEAR WASTE THROUGH DENSELY POPULATED URBAN AREAS ABSENT A FULL ENVIRONMENTAL IMPACT STATEMENT, INCLUDING CONSIDERATION OF ALTERNATIVE MODES OF TRANSPORTATION. FINALLY, A BILL INTRODUCED THIS SESSION BY CONGRESSMEN TED WEISS (H.R. 1146) WHICH CLARIFIES THE BURDEN OF PROOF IN INCONSISTENCY AND NON-PREEMPTION PROCEEDINGS, AND GIVES RECOGNITION TO THE FACT THAT THE HAZARDOUS MATERIALS TRANSPORTATION ACT IS AND SHOULD BE PRIMARILY A SAFETY STATUTE, ALSO DESERVES CONSIDERATION.

IN LIGHT OF THE SAFER ROUTE IDENTIFIED BY THE ADL STUDY, BROOKHAVEN'S INCREASED STORAGE CAPACITY, AND THE NEED TO PUT TO REST ANY LINGERING DOUBTS ABOUT THE ADEQUACY OF THE CASKS USED TO TRANSPORT WASTES FROM BROOKHAVEN, WE URGE A MORATORIUM ON ALL FURTHER SHIPMENTS OF SPENT FUEL THROUGH DENSELY POPULATED AREAS.

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

THE CITY OF NEW YORK,

Plaintiff,

and

THE STATE OF NEW YORK,
THE TOWN OF BROOKHAVEN,
and SULLIVAN COUNTY,

Plaintiff-Intervenors,

-against-

THE UNITED STATES DEPARTMENT OF
TRANSPORTATION AND THE MATERIALS
TRANSPORTATION BUREAU OF THE UNITED
STATES DEPARTMENT OF TRANSPORTATION,

Defendants,

and

COMMONWEALTH EDISON COMPANY, et al.,

Defendant-Intervenors.

State of Tennessee
County of Roane

## AFFIDAVIT OF LAWRENCE B. SHAPPERT

I, LAWRENCE B. SHAPPERT, being duly sworn, depose as follows:

1. I am Manager of the Transportation Group, Chemical Technology Division, Oak Ridge National Laboratory. My business address is Post Office Box X, Oak Ridge, Tennessee 37830. I make this affidavit based upon personal knowledge and knowledge made available to me in my official capacity.

2. The Oak Ridge National Laboratory (ORNL) operated by Union Carbide Corporation, Nuclear Division, under contract to the Department of Energy (DOE) conducts research for the Federal Government on nuclear energy and other matters. It is also involved with non-nuclear energy development and has significant efforts in engineering technologies, physical sciences, biomedical and environmental sciences and advanced energy systems.

3. My educational background is as follows: I hold a BS degree in Chemical Engineering from the University of Illinois (1954) and a MS degree in Nuclear Engineering from the University of Michigan (1958).

I have been employed at ORNL for 24 years. I have worked for approximately 20 years in the field of radioactive-material-shipping-container design and testing, have published many papers in this field, and was senior editor of a Nuclear Safety Information Center report entitled "Cask Designers Guide."

I authored a chapter on the shipment of radioactive materials in the book "Human and Ecologic Effects of Nuclear Power Plants" which was edited by Dr. L. A. Sagan and was published in 1974. My current responsibilities at ORNL include supervision of the Transportation Group, in the Chemical Technology Division, which performs system analyses of radioactive material transportation systems.

4. ORNL maintains certain population and transportation-related data including computer systems capable of (1) identifying and drawing population contours, within the U.S. borders, and (2) identifying and drawing highways on a U.S. map. The population systems contain official 1970 and preliminary 1980 U.S. Census Bureau Department of Commerce data at the county level and below, down to the enumeration district, a Census Bureau unit.

5. At the request of DOE and the Department of Transportation (DOT), ORNL has used the computer systems to determine which U.S. cities have population densities in excess of 20,000 persons per square mile. These high population zones might cover very small areas within the city limits or could cover large areas as in the case of Manhattan. A computer search indicates that the following cities contain areas which have such population densities:

1. New York, N.Y.
2. Jersey City, NJ
3. Newark, NJ
4. Patterson, NJ
5. Baltimore, MD
6. Washington, D.C.
7. Philadelphia, PA
8. Boston, MA
9. Los Angeles, CA
9. San Francisco, CA
10. Chicago, IL
11. Detroit, MI
12. Cleveland, OH
13. Oakland, CA
14. Vallejo, CA
15. New Orleans, LA
16. Miami, FL

The computer systems are undergoing further refinement which may possibly show that Vallejo and Oakland do not contain areas with population densities in excess of 20,000 persons per squire mile.

6. The above-described computer systems also provide the capability to determine major highway routes. ORNL used the computer systems to determine whether there are highway routes that can be used to avoid the high population areas of the cities listed in paragraph 5 above. Our search revealed that, with the exception of New York City, all high population areas having a density in excess of 20,000 persons per square mile can be avoided by use of alternative highway routes or circumferential beltways for all shipments originating outside such population centers.

Lawrence B. Shappert
LAWRENCE B. SHAPPERT

Executed on March 19, 1982

STATE OF TENNESSEE

COUNTY OF ROANE

Subscribed and Sworn to Before Me on

This 19 Day of MARCH, 1982

, Notary Public

My Commission expires 18 OCT. 1982

Mr. FLORIO. Let me express my appreciation to both of you for in a clear, lucid way, reinforcing the scope of the problems we are facing by attempting to deal with these problems a sensible, balanced way. You both have demonstrated that your understanding is beyond just the provincial concerns that you are both charged with representing. You have stated the problem goes to a much more basic level, and that has been very helpful to us.

Mr. Scheuer.

Mr. SCHEUER. I want to thank both of the witnesses and I would ask unanimous consent that the record be held open for a few days, in the event we want to ask these witnesses or any preceding witnesses any questions.

Mr. FLORIO. We have a vote. We will stand in recess for approximately 10 minutes and come back and conclude with our last witness.

[Brief recess.]

Mr. FLORIO. The committee will reconvene. Let me express my apologies to our last two witnesses. As many can appreciate, when you get down to the end of a session before a recess, there are multiple things that are going on. Today I have had to go to the Rules Committee, and we are now negotiating with the Budget Committee.

My apologies, and we would like to welcome Mr. Robert Bishop, the secretary and counsel for Northeast Utilities and chairman of the Electric Utility Companies Nuclear Transportation Group. Mr. Bishop is here today on behalf of the Edison Electric Institute and the American Nuclear Energy Council on Transportation of Nuclear Waste.

## STATEMENT OF ROBERT BISHOP, ON BEHALF OF ELECTRIC UTILITY COMPANIES NUCLEAR TRANSPORTATION GROUP, EDISON ELECTRIC INSTITUTE, AND AMERICAN NUCLEAR ENERGY COUNCIL

Mr. BISHOP. Good afternoon, Mr. Chairman. I will try to be brief as well.

I and the others have before you certainly apppreciate your patience. I know that the lack of attendance doesn't signify a lack of interest in the subject.

I do appreciate the opportunity to testify today and will submit my formal statement. I am testifying on behalf of the Nuclear Transportation Group, 37 utilities responsible for the operation or construction of 99 plants; the Edison Electric Institute, whose member companies supply electricity to 63 percent of the customers in the United States; and the American Nuclear Energy Council, whose 100 members are involved in many aspects of the nuclear fuel cycle.

As a utility person, my interest in this subject is as a shipper and that I be able to transport this material safely. As a utility person, I am also interested in putting forth the best interests of my constituencies, and that is the customers, making sure the materials are shipped cost effectively and safely.

I will avoid the temptation to argue the merits of the New York City City administrative proceeding before you today. I think that progress is important in that it will set the framework for future shipments that have to take place by utilities, by the Federal Government, by others.

I do think it is important that the record note that 300 shipments were made by Brookhaven through New York City, by highway prior to the health code amendments in 1976 and the 16 cents, without any incidents.

As you know now, the test that New York City must meet in its application is whether its requirement provides equal or greater protection of the public and that it doesn't unreasonbly burden interstate commerce, and DOT has that responsibility under law, as has been pointed out.

The statistics of transportation demonstrate that the condition of the road and miles traveled are the major determinants of accident rates. That, I believe is the foundation for the DOT's conclusions as the responsible Federal agency for determining that the interstate highway system should be used, and beltways, where available, to bypass population density. But that is not in itself a determinant in the accident statistics, but has a bearing on the consequences, however.

I happen to be a resident of that little State of Connecticut that Congressman Biaggi referred to earlier. The concern of prior speakers and responsible Federal agencies is to do what is right. I don't think, with the possible exception of what appears to be a difference of opinion on the MH-1A task, and its capabilities and certification, there are not that many technical issues. Many of us have been raising a number of issues over the decades. Transportation has recently had a real focus to it and the Federal agencies responsible are responding to that.

In my judgment, there are three points that I think the committee should consider:

One is that there is a comprehensive and legal and regulatory framework in which transportation must take place, which is founded in the Constitution, embodied in the Hazardous Materials Act, and the Federal Railroad Safety Act.

There have been greater than 5,500 shipments of commercial spent fuel, and I don't know how many shipments of defense wastes or military spent fuel that have taken place and that has been without a single accident that has resulted in a release of radiation or any risk to the general public.

There have been accidents, but such a transportation record, in my view, is no accident. This comprehensive system is much more comprehensive than that associated with the transportation of any other hazardous material, including those that unfortunately frequently result in whether they are determined catastrophes or not, to the individuals who are killed or injured by gasoline truck shipments, a variety of commodities in interstate transport.

Of the more than 1,000 categories of hazardous materials that are listed in the title XLIX of the Code of Federal Regulations, 6 of those entries deal with radioactive materials, and we must keep a perspective about the transportation of radioactive materials and other hazardous materials.

Allowing States or localities or Indian tribes to usurp the comprehensive regulatory system would create havoc, in the words of the chairman. The system has proven its value, workability, proven to be in the best interests of the public.

There is a process within that system whereby local conditions can be taken into account, and New York City is involved in that process right now.

I don't believe that any statutory or regulatory requirement should be established, modified, or eliminated without a sound, technical justification.

I believe decisions should be made on facts with a clear sense of perspective, that in fact, as you have pointed out, this is a national issue that requires a national resolution.

It is not a case of New York City versus New York or New York City and New York versus Connecticut, but rather, its implications are much broader than that.

I think the issue can best be summed up and the challenge by the words of the Federal district court in the city of New York case where he stated that the national interest requires courageous regulation in the face of public opposition on issues commanding extraordinary media attention.

I believe similarly it requires courageous legislators as well.

[Testimony resumes on p. 243.]

[The prepared statement of Mr. Bishop follows:]

## Testimony of Robert W. Bishop

My name is Robert W. Bishop. I am Secretary of Northeast Utilities, a registered public utility holding company, and of its operating subsidiary companies which supply electric and natural gas service to approximately 1.2 million customers in Connecticut and Western Massachusetts. Northeast Utilities system companies have an ownership or entitlement interest in six operating nuclear power plants and two nuclear power plants under construction in New England. In 1984 our nuclear units delivered 57 percent of our energy requirements, saving more than 23 million barrels of oil, which resulted in net savings to our customers of $244 million. Our customers have benefited significantly from our commitment to nuclear power; the total net savings to our customers since we began using nuclear power now exceeds $2 billion, about twice what it cost just to build those nuclear facilities.

My testimony is presented on behalf of the Electric Utility Companies' Nuclear Transportation Group ("NTG"), the Edison Electric Institute ("EEI") and the American Nuclear Energy Council ("ANEC"). I am Chairman of the NTG, which consists of 37 investor-owned and publicly-owned electric utilities responsible for the construction or operation of 99 nuclear power reactors. The NTG was formed in 1978 because of the growing concern of the electric utility industry about the effect of federal, state and local laws and regulations on the ability of electric utilities to transport fuel cycle materials essential to the safe, prudent and economic operation of their nuclear power plants.

EEI is the national association of investor-owned electric companies. Its members serve approximately seventy-three percent of all ultimate customers in the nation. ANEC represents over 100 organizations having an interest in nuclear energy, including investor, public and cooperatively-owned utilities, manufacturers, architect-engineers, and various firms in the nuclear fuel cycle.

The operating subsidiaries of Northeast Utilities and the many electric utility companies with nuclear power plants located throughout the country, as well as research facilities and national laboratories that operate nuclear reactors, must periodically make shipments of spent nuclear fuel and other radioactive materials in support of the operation of those facilities. If spent nuclear fuel and radioactive waste cannot be transported away from these sites, operation of the reactors eventually must cease. The NTG has participated in federal agency rulemaking proceedings, and in judicial proceedings when necessary, to assist in stabilizing the environment in which safe and efficient transportation can take place. The NTG has also testified before Congressional committees and has worked with states and other parties interested in radioactive material transportation matters to achieve the same end.

Although commercial nuclear power plants have been in operation in the U.S. since the 1950s, supported by the transportation of nuclear fuel cycle materials, it is only fairly recently that transportation of radioactive materials has become an issue that has attracted significant public attention. Such events as the passage of the Nuclear Waste Policy Act of 1982, mandated shipments of high level waste from West Valley, New York, a shortage of storage space at certain nuclear power stations with the ensuing need for off-site shipments, and the issuance by the U.S. Department of Transportation of a regulation governing the highway routing of radioactive material shipments have resulted in an increased focus on the transportation of radioactive materials.

The U.S. Constitution establishes, among other things, the power of Congress to regulate interstate commerce (and to prevent states from erecting barriers to interstate commerce) and elevates federal law above state law if the latter conflicts with federal law. Following from this most fundamental basis, Congress has created a comprehensive federal system of regulation of transportation through the passage of legislation including the Atomic Energy Act of 1954, Federal Railroad Safety Act of 1970, and Hazardous Materials Transportation Act of 1974. These Acts, and their implementing regulations, comprehensively regulate the transportation of radioactive materials.

The state and local regulation of transportation, emanating from the Reservation of Powers Clause of the Tenth Amendment to the U.S. Constitution and from the inherent police power of state and local governments, is invalid if it creates an undue burden on commerce or conflicts with the federal regulatory system. Although the Constitution, Congress, the courts and federal regulatory agencies have carefully circumscribed the responsibilities of the states and localities in this area, states and localities have not been precluded from participating in the regulation of transportation (e.g. to address unique local conditions through the selection of alternative routes that provide at least an equivalent degree of protection to the public as that provided by federal regulation, to participate in the enforcement of DOT regulations and to develop appropriate emergency response capabilities).

In terms of perspective, it is important to remember that there are approximately 100 million shipments of hazardous materials made each year in the United States. About 3 percent of those shipments are of radioactive materials; less than 1 percent of the shipments of radioactive materials are shipments associated with the nuclear fuel cycle. A very small percentage of hazardous materials shipments (approximately .0003 percent) are spent nuclear fuel shipments. Yet it is these latter shipments that have generated the most publicity and expressions of public concern. Public anxiety and the attention of many government officials has been focused particularly on spent fuel shipments because of the large amount of radioactivity they contain, which is an inherent physical property of these materials. Although the radioactivity in the spent fuel is contained in casks that have been carefully designed and certified to rigorous regulatory standards, and have been demonstrated, both nationally and internationally, to be far more secure than the containers used for carrying any other potentially toxic material, fear of a catastrophic release is a concern for some people who believe the casks might someday pass near them.

In my opinion, the recent flurry of laws and regulations on the State and local level attempting to ban or severely restrict the transportation of spent fuel and other high level radioactive waste stems in large part from a misunderstanding of the actual risks of such transportation, and an attempt to respond to the concerns, however ill-founded, of political constituencies. The result is an attempt at regulatory isolation--a not through my backyard syndrome--that places a burden on interstate commerce and that will likely increase the risks and costs of radioactive materials transportation.

To date, over 5,000 spent fuel assemblies have been shipped in this country and not one has been involved in an accident which resulted in a release of radioactive materials. The exemplary safety record of the transportation of nuclear materials is the result of the care with which utilities and other shippers treat these materials and the coordinated and comprehensive regulation of transportation by the federal government. No other hazardous material has been subjected to the same level and sophistication of regulatory control as have radioactive materials. Nonetheless, alleged safety risks from the transportation of spent fuel and high level waste are increasingly the subject of attention by government officials, the press, and the public -- attention that generally exceeds the attention devoted to any other toxic or hazardous material being transported today, including materials that have historically and all too often caused deaths and injuries, significant property damage and major public disruptions, such as the evacuation of thousands of people.

It is not my purpose today to delve into the need for better understanding by the public and elected and appointed officials of the relative safety of and the need for transporting nuclear materials, although I believe that that understanding is essential in the long run for public acceptance of this activity.

What I would like to focus on today are the fundamental lessons that we have learned from the several years of effort by Federal and State agencies to address and attempt to resolve the legal, regulatory and legislative problems associated with the movement of these materials. In my view, nuclear transportation can and should proceed in accordance with certain fundamental principles, which include the following:

- The public at large is best protected by the establishment of a national, uniform, comprehensive regulatory system, and in my judgment that system largely exists today and has proven its value and workability.

- There must be nation-wide, uniform federal standards for the packaging and transportation of nuclear fuel cycle materials which must preempt inconsistent state or local regulation to prevent the chaos which must surely result if each state, local or tribal government is allowed to enact its own regulation without any concern for the possible effects on other jurisdictions.

- Shippers, whether utilities, the federal government or others, must be able to use any or all available modes of transportation in order to be able to choose the most advantageous one, from the standpoint of safety, efficiency and cost, as individual circumstances may dictate.

- State, local and tribal officials should participate within the framework of the Department of Transportation's highway routing regulations and other applicable law to ensure that particular unique local circumstances (e.g., degraded or perilous road conditions, unsafe bridges) are properly accommodated.

- No regulatory requirements should be established, modified or eliminated without a sound technical justification.

In the last decade it has been estimated that hundreds of states and localities have passed laws, regulations or ordinances that have restricted, and in some cases prohibited, the transportation of radioactive materials through their political boundaries, notwithstanding the excellent safety record of the transportation of these materials or the potential negative effects of their decisions on the citizens in neighboring jurisdictions. Largely in response to these actions, DOT developed a highway routing rule for radioactive materials (Docket No. HM-164) to provide a consistent national framework for highway shipment to best serve the public interest.

The City of New York (the City) has, in a variety of administrative and legal proceedings over the last nine years, attempted to preclude the transportation of spent nuclear fuel through its jurisdiction, specifically the transportation of spent fuel resulting from research activities conducted at the Brookhaven National Laboratories on Long Island, New York. It is important to note that prior to the City's actions in 1976 to effectively ban the transport of this material through the City by highway, over 300 shipments of this material had taken place through the City without incident, so this is clearly not a case where poor performance was a justification for regulatory action. The City's challenge of the DOT highway routing rule was unsuccessful in that the promulgation of that regulation was determined to be a valid exercise of DOT's rulemaking authority, and responsibility, under the Hazardous Materials Transportation Act.

At present, DOT is considering the City's request for a non-preemption determination, pursuant to the provisions of the Hazardous Materials Transportation Act, in which the City must demonstrate that its requirement affords an equal or greater level of protection to the public than that afforded by HM-164 and that the imposition of the City's requirement will not unreasonably burden commerce. A decision in that proceeding is expected in the near future, and this is not an appropriate forum to argue the merits of that case.

I must state, however, that present and future shippers of radioactive materials are vitally concerned with this proceeding, because the existing federal statutory and regulatory framework for radioactive material transport, of which HM-164 is an integral part, affects their ability to transport such materials, and will set the framework for future shipments both by private shippers and by the U.S. Department of Energy as it carries out its responsibilities for the transportation of spent fuel and high level waste under the

Nuclear Waste Policy Act of 1982. It is vitally important that this proceeding be conducted strictly in accordance with the statutory criteria governing such matters, and that any determination made by DOT be based on sound technical justification. The political controversy with which this issue has become imbued should not be allowed to compromise the integrity of the statutory and regulatory framework governing radioactive materials transport. As the U.S. District Court stated in the case City of New York v. DOT (539 F. Supp. at 1293), "The national interest. . . requires courageous regulation in the face of public opposition on issues commanding extraordinary media attention".

## Conclusion

There now exists a comprehensive federal framework, both statutory and regulatory, within which radioactive materials must be transported. State and local concerns can be appropriately accommodated within that framework, but it is critical to our ability to safely, prudently and economically transport fuel cycle materials essential to the operation of our nuclear power plants that a national, uniform, comprehensive regulatory system be maintained. The public at large will be best protected by such a system, which largely exists today and has proven its value and workability.

Mr. **Florio**. Thank you very much for your statement. Do you think there is any role in the decisionmaking process, in terms of determining routes or other transportation considerations, for an evaluation as to whether there should be any transportation at all?

Representing Edison Electric, do you feel there may be a need for, the authority for, expanded onsite capacity which might be an appropriate alternative to transporting offsite?

Mr. **Bishop**. That may be an effective alternative at some sites, and maybe not others. The utilities are caught. They get no great joy out of transporting materials. They are required by their State regulatory agencies or Federal rate regulation to do that which is cost-effective.

Reracking, dry storage, or other alternatives will be far more economic or will even be more economical than transportation.

Nobody benefits by transporting materials they don't have to.

Mr. **Florio**. The cost-effectiveness component is in the regulatory mechanism in terms of the operation of the facility. What I am suggesting is maybe there is some value in formally rolling into the transportation evaluation, routing and so on, a requirement that someone look at possible cost-effective alternatives to offsite transportation. These alternatives might include the expansion of on-site storage so as to minimize or reduce offsite transportation.

Is that something that perhaps we should consider?

Mr. **Bishop**. I think it happens. Whether it is mandated by regulation or not.

Mr. **Florio**. Well, we had the officials from DOE say they are inclined to maybe from time to time make recommendations, but the gentleman couldn't cite any specific recollection as to when that happened.

Maybe we should make sure that DOE is charged with evaluating DOT's evaluations and making suggestions. We should also make sure that somebody evaluates whether onsite expansion is a better, cost-effective, safe alternative under certain circumstances on a site-specific basis to transporting offsite.

That is what we hope to gain from this hearing—some specific recommendations as to things we should be doing in the statutory framework. I appreciate your testimony very much.

[The following letter was submitted for the record:]

**NORTHEAST UTILITIES**

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

NORTHEAST UTILITIES SERVICE COMPANY
P.O. BOX 270
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ROBERT W. BISHOP
*SECRETARY AND COUNSEL*

August 6, 1985

The Honorable James J. Florio
Chairman
Subcommittee on Commerce,
Transportation and Tourism
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

At the hearing before your Subcommittee on August 1, 1985 concerning transportation of spent nuclear fuel and nuclear waste you asked me whether there should not be a review by some Federal agency of on-site alternatives to transportation before such transportation takes place. This letter supplements my response at the hearing and I request that you include it in the hearing record.

In considering this subject it is important to bear in mind that there has already been extensive consideration of the environmental effects of transportation under present regulations as well as alternatives to the present regulations. Moreover, two professors from Louisiana State University determined that there have been over 800 scientific or technical analyses of radioactive materials transportation, or some facet of it. They concluded that there was a remarkable international consensus that the risks to the public from the transportation of radioactive materials are extremely low and that the risks to the public from the transportation of other potentially hazardous commodities, such as gasoline and chlorine, are far higher.

Radioactive waste, like all other waste, must ultimately be transported from the site where it was generated to a disposal facility. In the case of spent nuclear fuel from commercial nuclear reactors, Congress has already determined through passage of the Nuclear Waste Policy Act of 1982 that this material should be transported to geological repositories for permanent disposal. Congress expressly acknowledged the possible need, prior to construction of a repository, for electric utilities to tranship spent fuel between their facilities and specifically required that utilities pursue such an alternative, among others, before becoming eligible to use interim storage capacity to be furnished by DOE.

In summary, the need for shipments of spent fuel from operating nuclear power reactors and alternative thereto have already been addressed by Congress. A requirement that a more specific determination should be made whether on-site alternatives are preferable to transportation proceeds from the false assumption that shipments of spent fuel under the current regulatory framework are so dangerous that they should only be permitted in the event of dire need. There is no basis for such an assumption.

In this connection, the discussion during the hearing of the provisions of HM-164 as they apply to use of alternative modes was sometimes confusing, in my judgement. The HM-164 rule applies to highway transportation and prescribes rules for choosing appropriate routes for transporting radioactive materials by truck. This rule does not mandate highway transportation of such materials or establish a preference for that mode. I believe it is important for the record to be clear on that point.

Sincerely yours,

Robert W. Bishop
per LWT
Robert W. Bishop

**Mr. Florio.** Mr. Linsay Audin and Mr. Mark Schienberg, they represent Citizens Against Nuclear Trucking.

They have been very patient, non-scheduled witnesses, but out of respect for them, welcome to our committee. We would be happy to accept from you a full statement which we will include in the record.

## STATEMENT OF LINDSAY AUDIN, TECHNICAL DIRECTOR, CITIZENS AGAINST NUCLEAR TRUCKING

**Mr. Audin.** I am Lindsay Audin, technical director for Citizens Against Nuclear Trucking, which is a public action group.

I am a mechanical engineer and technical consultant on nuclear transport to the city of New York. I have been involved in that issue for the past 10 years as an advocate of improved shipping and handling procedures for irradiated nuclear fuel from research and commercial atomic reactors.

I was research consultant and coauthor of the 1983 study of this issue published by the Council on Economic Priorities entitled "The Next Nuclear Gamble," a portion of which covers cask testing and is appended to my testimony.

The council is a private, nonprofit, nonpartisan policy research group based in New York City. I have also been involved closely with New York City officials in the preparation of the city's application to the Department of Transportation for a waiver of Federal rules that would reinstate the city's regulation of high level nuclear waste shipments.

I am speaking today as the technical director for the Citizens Against Nuclear Trucking, a public action group formed 17 months ago when shipments through the city once again threatened our members' lives and property.

My statement today addresses the need for greater congressional oversight on nuclear waste container standards and the use of those casks. Others have addressed the problems of routing, and emergency preparedness, both of which are very important.

I believe, however, that the information I will reveal today may give pause to the notion that the shipments under Department of Energy control should be allowed to continue, regardless of the route taken.

Federal involvement:

The primary line of defense against a release of radiation during a shipping accident is the container for the irradiated nuclear fuel assemblies that are building up at reactors around the country.

Made of lead and steel and weighing between 15 and 100 tons, these casks are designed to withstand the worst likely accident that could be expected during transport by truck or rail.

Responsibility for certification of the cask design is ostensibly under the Department of Transportation, but, by a memorandum of understanding with the Nuclear Regulatory Commission and the Department of Energy, actual oversight is performed by those two agencies.

Unfortunately, neither agency has been as consistently diligent as is necessary to properly handle the dangerous materials being shipped, nor has oversight by the DOT been adequate.

The Brookhaven shipments:

A good example of the problem exists in the shipments of spent fuel from Brookhaven National Laboratories, a DOE facility on Long Island near New York City. Since the reorganization of the Government's nuclear activities in 1974, the DOE and NRC have divided coverage of nuclear cask certification according to the facilities under their statutory control.

NRC certifies casks used by nuclear power plants, university and private reactors while the DOE keeps an eye on containers used by government labs and nuclear weapons facilities.

Container certification methodologies of the NRC and DOE are required to be equivalent under existing Federal regulations, (see 49 CFR 173.7(d)) but this has not been the case with regard to containers moving fuel from the High Flux Beam Reactor [HFBR] at Brookhaven.

Our examination of the records on these containers shows that the original cask, called the HFBR cask after the reactor it was designed to serve, was certified by the DOE with no attention to the cask's seal, probably its most vulnerable point.

As a result, the container was unable to contain its atmosphere under even the slight pressure of 20 psi and leaked through the seal about as fast as a punctured flat tire. This was the normal condition of the cask during its first 18 years of use.

No effort was made to correct the problem because the DOE did not even have a requirement that containers under its control pass a specific leak test. The NRC has such a rule in its certification requirements but only brought it to the DOE's attention when the DOE asked the NRC to certify the HFBR for use by NRC facilities.

The NRC refused to do so until the seal was improved. The cask had previously been used for over 100 shipments through New York City, fortunately without an accident that could have damaged the seal.

It was about to be used for more shipments after a 9 year ban by New York City was overturned by the Federal court of appeals.

The improved seal isn't much better, however, as it will vaporize during a fire. To get around the problem, the DOE claimed that there really was no need for a seal in the first place, as the 1/64th-inch of aluminum cladding on the fuel would provide the necessary containment in case of an accident. The NRC never ruled on this assumption, though, because the DOE withdrew the HFBR cask from any further NRC consideration.

The DOE then decided to delay shipments from Brookhaven until a larger cask was available, ostensibly as a money saving measure to reduce the number of shipments. This cask, called the MH-1A after the Army reactor it served until it was shut down in 1976, was also certified only by the DOE.

Once again, the DOE sought NRC certification to allow use of a cask by an NRC regulated facility.

The NRC's initial response listed five pages of problems with the design as well as deficiencies and errors in the safety analysis report, which is the foundation of the claim that the cask is safe.

The DOE added a fire shield, removed valves and made numerous corrections in its report. Its response to the NRC was not sufficiently detailed, however, to allow the NRC to agree that the MH-1A was certifiable.

Nevertheless, the DOE felt it answered all of the NRC's qualms and began using the MH-1A for shipments through New York City on January 21, 1985.

Despite numerous concerns expressed to the DOE by several Congressional Representatives, the MH-1A was used at least 11 times in the next 4 months.

Finally, the NRC was able to review the DOE's claims in detail and numerous deficiencies were again revealed. The primary focus of the problems is on the structural integrity of the cask and its ability to thereby maintain leak tightness.

On May 21, the Department of Transportation finally entered the picture when it attended a meeting called by the NRC to discuss the problem.

The next day, the DOT ordered the DOE to withdraw the cask from use until the DOE could demonstrate that its analysis was equivalent to that of the NRC and the structural questions were properly settled.

As of this time, the DOE has been unable to do so, in effect admitting that it utilized a potentially unsafe container to move the most dangerous wastes 11 times through the most densely populated area of the country despite valid and sustained congressional questioning. Such negligence calls for action.

The story does not end there, however. The DOE then decided to continue shipments with a third container, the GE-700, which had previously received NRC certification. No attention had been given to the practicality of this cask before its use was initiated.

Designed for a smaller reactor, the GE-700 is capable of holding only nine spent fuel assemblies per shipment, while the MH-1A handled 32 assemblies.

The number of shipments would be unable to even keep pace with the flow of fuel needing removal. The DOE had made a great issue of the backlog of fuel at Brookhaven, yet it now was willing to use a container that would greatly increase the risk of shipping, since such risk is proportional to the number of shipments, while not alleviating the backlog.

Use of the GE-700 would also triple the cost of shipping, not an insignificant expense at $12,000 per shipment. Annually, use of the smaller cask would waste over $400,000. The urgency to ship the fuel had long since been eliminated by the prior 11 shipments which yielded over 2 years of empty space in the reactor's storage pool.

Only when pressed by Representative Biaggi did the DOE agree that use of the GE-700 was uneconomical as presently configured, and withdrew it from use. Such ill-conceived actions by the DOE deserve greater oversight by Congress before taxpayer money is wasted and citizens' lives and property are unnecessarily risked.

I might point out also that the information regarding the economics of the GE-700 and the problems of the Brookhaven casks was made public by the research and political involvement of the citizens against nuclear trucking.

A national problem: Our research into this area has uncovered another dismaying fact. We have found that the DOE's use of questionable containers is not limited to the Brookhaven shipments, but rather is a phenomenon of national proportions.

As previously mentioned, the DOE certifies casks for use by DOE licensed facilities, primarily Government labs and weapons plants.

Over the past 7 years, the DOE has attempted to obtain NRC approval of 25 containers used for shipping a variety of materials ranging from uranium scrap metal to spent fuel and plutonium.

Our research indicates that the DOE has been unable to meet NRC criteria for a number of these containers, especially those used for carrying the most dangerous materials.

When queried on the problems, the DOE has been consistently slow in responding, sometimes waiting 2½ years to answer NRC queries. During such time, the DOE continued to use the potentially dangerous casks.

When the NRC's questions became too difficult for the DOE, the two agencies simply agreed to no longer discuss the problems. The NRC was then taken out of the position of criticizing the cask designs, and the DOE could continue to use them despite their possible defects.

A May 31, 1983 letter from the DOE to the NRC details 10 containers for which the DOE no longer sought NRC certification. That list includes the following casks:

The LLD-1, a plutonium cask used extensively in the 1970's to ship powdered plutonium oxide, perhaps its most dangerous form. This cask was used in 1974 and 1975 for shipments across Manhattan Island in New York City on its way to a Pittsburgh fabricating plant.

Our research shows that the DOE later became aware that the containers were unable to satisfactorily contain plutonium oxide and ceased requests to certify it to hold that material.

The NRC also pointed out that the LLD-1 might allow the plutonium to become "critical" during a fire, thereby creating a burst of high-level radiation that could destroy the cask and disperse the powder.

Fortunately, there was never an accident involving the LLD-1. Ten percent of this material in an area like New York City could result in thousands of deaths and over $3 billion worth of damage.

If there were to be such a spontaneous criticality, more than 10 percent of the material would be released. It is not just New York City that was nearly a potential victim of this negligence. It is also the city of Chicago.

The ANL-402, a spent fuel and plutonium cask which was used routinely for dozens of shipments between Government casks in Argonne; IL. Idaho Falls, ID; and Richland, WA.

The DOE was unable to convince the NRC of the structural adequacy of the container but the DOE still uses it for shipments to and from its Chicago lab.

The HNPF, a now obsolete spent fuel cask used for shipments from the Hallam nuclear plant in Nebraska and the Peach Bottom reactor in Pennsylvania to the Oak Ridge, TN, Federal laboratory in the late 1960's and early 1970's.

The NRC raised questions regarding the ability of the cask to withstand a puncture, a fire, and a 30-foot drop. This cask was involved in an accident in 1971 in which the driver was killed and the truck overturned.

Fortunately, again, the container was not subjected to any severe strain as it slid into swamp land adjacent to the highway.

The previously mentioned HFBR cask, used to ship Brookhaven's fuel across New York City for 11 years was also among those which the DOE removed from NRC attention. I have already detailed the seal problems of that container.

The other six casks have been used for numerous other shipments around the country, but shipping data was unavailable to our staff due to DOE intransigence. Despite efforts to obtain such records via Congressman Scheuer's office, the DOE now says that only a formal request from this committee can force them to produce that information.

The exact data we seek is readily available in NRC/DOE form 741, a sheet filed on each shipment with the DOE. I request that your committee petition the DOE for those forms on all containers it has withdrawn from NRC scrutiny, so that we can examine them to learn the extent of the usage of those casks.

Five other containers are no longer under consideration by the NRC due to withdrawal by both the DOE and the NRC this year. It is unclear why these five were dropped from examination so recently. Three were handled by the DOE office in Albuquerque, NM, and the other two by the Oak Ridge, TN, office. Again, no shipping records were available.

In all 11 cases, the NRC raised serious questions regarding the ability of the containers to withstand dropping, puncture, and other requirements needed to assure containment of radiation.

Conclusions and recommendations: It is now readily apparent that the DOE has abused the public trust and its memorandum of understanding with the DOT by its negligent and careless handling of cask certification.

It is also obvious that the NRC was a willing accomplice by allowing the DOE to withdraw potentially faulty containers from its purview without any effort to halt their usage through highly populated areas. All the talk of cask safety is irrelevant in the face of such human folly.

We recommend four actions:

One, an immediate halt to the use of the containers not certified by the NRC.

Two, permanent suspension of the DOE's cask certification powers. The NRC should be sole agency with that responsibility.

Three, a congressional investigation of the complicity by the NRC in the use of such casks it knew may have been defectively designed.

Four, greater congressional oversight in cask design, manufacture and certification.

To avoid taking such action is to invite the notion that Congress would also be a willing participant in the charade of cask safety presently being perpetrated by the nuclear and transportation agencies of this administration.

Thank you for this opportunity to speak on this subject. I will be happy to answer any questions or supply any data requested by this committee.

Mr. **Florio.** We will be pleased to receive your information and requests to evaluate it to see what the committee can do.

[Testimony resumes on p. 314.]

[Attachments to Mr. Audin's statement follow:]

August 20, 1985

U.S. House of Representatives
Committee on Energy and Commerce
Room B-334, Rayburn House Office Building
Washington, D.C. 20515
ATTN: Mr. Robert Sommar

Dear Bob;

Enclosed find:

- -my corrected testimony on nuclear waste shipping containers
- -49 pages of "The Next Nuclear Gamble" which I want appended to my testimony, as per my opening statement
- -several questions and answers that expand upon my testimony, as per your offer; please feel free to edit them with my permission should you feel any are inappropriate to the hearing content.

Once again let me thank you for the opportunity to discuss this issue before Rep. Florio's Committee. I hope to hear from you soon regarding my request for the NRC/DOE Form 741's needed to determine the extent of the usage of containers about which open safety questions exist. In case there is any confusion regarding the containers in question, following is a listing of their model and license numbers. All are certified by the DOE and shipping records are available from the DOE offices responsible for the containers (i.e., mainly the Chicago office, but also possibly the Albuquerque and Oak Ridge Offices).

| MODEL NUMBER | CERTIFICATE OF COMPLIANCE NO. |
|---|---|
| LLD-1 | 4960 |
| ANL-402-SPM/403-5PM | 6345 |
| HFBR (a/k/a BR-63-0101) | 5608 |
| HNPF | 5469 |
| ANL-390 | 6104 |
| ORNL In-Pile | 5907 |
| AL-L11 | 5885 |
| AL-L8 | 5645 |
| 6421 | 6421 |
| ORNL Loop | 5753 |
| ORNL Garden Carrier | 6088 |
| Paducah Cask | 6435 |
| MH-1A | 6639 |

Please forward a paper copy of the forms to me at my home address so I may process the documents into a form usable by the committee.

Yours truly,

Lindsay Audin

## QUESTIONS ON CASK SAFETY ISSUES

1. You suggest placing all cask certification power in the hands of the NRC. How do you assess NRC's job in regulating containers under its jurisdiction?

NRC moves more carefully and thoroughly than DOE but still leaves much to be desired. The primary values in transferring the DOE casks to NRC jurisdiction come from the opportunity for public entry into NRC proceedings and the better management shown by NRC in this area over the past 5 years. NRC still fails to enforce cask handling rules with the same diligence it applies to reactors, however, and cannot be depended upon to do so in the future without greater Congressional oversight.

One especially disconcerting example of NRC inattention to cask safety occurred in 1980 when spent nuclear fuel decomposed into a powder during a shipment from Connecticut to Ohio. Despite the serious contamination of a laboratory (when the cask was opened) and the cask itself, the NRC took no action to avoid the re-occurrence of such decomposition until pressed to do so by the Sierra Club over three years later. Sierra club acted on information I provided them after I failed to arouse NRC concern at a face-to-face meeting between myself and NRC officials. When the NRC did act, it did so incompletely by putting out new rules affecting only commercial spent fuel casks while ignoring research casks that may exhibit the same problem. When pressed to act on this matter, the NRC shrugged it off by bureaucratic maneuvers. As a result, NRC certified casks are today on the road that could release radiation in powder form were they involved in a serious accident. Congressional oversight is needed to create a mechanism to correct such errors when the NRC's own procedural machinery breaks down.

2. What other problems do you perceive in the NRC's cask certification procedure?

As I have detailed in the excerpts of the CEP book on this issue, there is cause for concern regarding cask testing. Only scale models and computer simulations are tested; no full scale casks have ever been subjected to the conditions built into the drop,puncture and immersion tests detailed in the Code of Federal Regulations. There are several reasons why such full scale tests are needed:

A) They would expose manufacturing deficiencies, many of which have remained undetected for years
B) They could reveal errors in the computer simulations (such errors have also gone undetected for years)
C) They could serve to assure the public that "no stone remains unturned" in the search for safety; England and Germany performed such tests and obtained much good public feed back from them.

Finally, I believe the tests themselves need to be upgraded to reflect real worst case scenarios. For example, the fire test should be for 1 hour at 1800°F instead of the present 30 minutes at 1475°F. Similarly, a crush test is needed and the fire and puncture tests should be reversed in order. Further details on testing problems appear in the excerpts from the CEP book.

# The Next Nuclear Gamble

## Transportation and Storage of Nuclear Waste

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# V

# Transportation of Nuclear Fuel

## The Division of Responsibility for Nuclear Shipments Among Federal Agencies, State and Local Governments, and the Private Sector, Including a Detailed Discussion of Shipping Containers and Securement Devices, Driver Training, Emergency Preparedness and Transport Economics. Shipping Container Performance Standards Are Reviewed

Irradiated fuel is being shipped in the U.S. today, but the yearly number from commercial power reactors is quite small. Shipments from foreign and domestic experimental reactors and naval reactors significantly add to the total. An average of 96 commercial and experimental shipments occurred annually between 1979 and 1981. This number is expected to drastically increase to approximately 13,000 annually by the year 2000 if a federal depository, reprocessing plant or AFR facility becomes operational.

In this Chapter, the entire system of irradiated fuel transport is analyzed. We study the design, construction and testing of shipping casks to determine if they can withstand serious accidents. We examine the role of the federal Department of Transportation in ensuring that transport vehicles are safe, drivers trained and communities prepared for a transportation accident. We also review the cost of transporting irradiated fuel and study the feasibility of barge and rail transport.

## Why Ship At All?

Four categories of nuclear reactors ship irradiated fuel: commercial power, research and small commercial (such as medical isotope), foreign and military. The needs of at least one—commercial reactors—are expected to increase dramatically in this decade and the next, surpassing in total radioactivity all other reactor categories by a factor of ten.

Within the past 15 years, some irradiated fuel has been moved from commercial reactors to the now-defunct reprocessing plants at Morris, Ill. and West Valley, N.Y., and for research purposes to Batelle Memorial Institute in Columbus, Ohio and Idaho National Engineering Laboratory (INEL) in Idaho Falls, Idaho (see Table 5-1). General Electric is still accepting fuel to be stored in the pool at Morris, Ill. from a limited number of reactors (San Onofre and Cooper Station, for example). Utilities have also shipped fuel between reactors to utilize the available space at newer reactors. This practice, called transshipment, has taken place between Duke Power's Oconee and McGuire reactors. As previously detailed, however, many commercial power reactors are reaching maximum capacity for irradiated fuel storage using present technologies. Utilities have had to move rapidly to license and install additional on-site storage systems before storage space is exhausted. Even if a reactor is phased out, the irradiated fuel will eventually have to be transferred to a final depository. A phase-out would decrease the amount of fuel that needs to be transferred and therefore lessen the transportation and storage problems.

With the passage of the Nuclear Waste Policy Act of 1982, and the start-up of a federally sponsored AFR storage program, transfer of irradiated fuel to one of the temporary storage locations may begin as early as 1984. Since irradiated fuel will remain hazardous for one hundred thousand years and more, this study assumes that the safest long-term option is to dispose of irradiated fuel in one or more deep underground depositories, providing a geologically suitable location can be found.

In addition to fuel transported from commercial reactors, fuel from eighty research and isotope manufacturing reactors (DOE, 1979) both here and abroad is sent to be reprocessed at U.S. government installations. Between 40 and 60 shipments per year have been moving from foreign experimental reactors through Portsmouth, Va. to Savannah River, S.C., and from domestic research reactors to INEL (NRC, 1982a). The U.S. has also agreed to receive irradiated fuel for storage or reprocessing from foreign reactors in quantities that could become quite large (up to 15,000 tons total) in the next 25 years (DOE, 1980a). In some cases, the purpose is to prevent proliferation of weapons-grade material by removing it from areas considered politically unstable, where a changing government could mean loss of control of the fuel. Similarly, 156 military reactors (DOE, 1979), 128 of which are on submarines and aircraft carriers, discharge irradiated fuel which the U.S. government reprocesses at INEL. Submarine fuel is shipped by train directly to INEL from eight naval shipyards (three on the West Coast and five on the East Coast). Small "water pits" have been built at shipyards in which the larger nuclear aircraft carrier fuel is packaged to fit into submarine fuel shipping casks. Continual use of these naval vessels, which have power plants about one-tenth the size of a commercial reactor, requires frequent movement of the irradiated fuel as each ship is refueled. Information regarding military shipment is classified.

## Federal Regulatory Responsibility for Shipments

In the early part of this century, numerous state laws were enacted to govern truck load limits, record-keeping, packaging, etc. This patchwork eventually resulted in conflicting rules that impeded interstate commerce. To make these rules uniform, in 1933 Congress passed the Interstate Commerce Act creating the Interstate Commerce Commission (ICC), the first agency to regulate the interstate shipment of goods under one set of rules (Kovacs, 1979). As the nation grew, so did the work of the ICC. Sub-agencies were formed to focus on specialized tasks. One was the Bureau of Motor Carrier Safety (BMCS) which, for many years, was the primary collector of truck accident data. Eventually it became necessary for the federal government to regulate all modes of interstate transport. A cabinet level agency, the Department of Transportation, was created in 1968 to absorb and coordinate all transportation activities.

Radioactive materials were treated in much the same manner as other cargoes of a hazardous nature, with general rules governing their routing and handling. The basis for this policy lay in the reliance on shipping containers as the ultimate safeguard. Simply stated, the agencies believed that no significant restrictions or special treatment were needed if the packaging was made strong enough to withstand the worst accident ever likely to happen. This general notion allowed almost any trucking company to compete for contracts to move radioactive and other hazardous materials.

The original standards for nuclear containers were developed from research performed for the AEC during the early years of nuclear weapons development. As the Atoms for Peace program expanded in the 1950's, more effort was made to transfer the handling of nuclear materials into private hands. In so doing, the AEC paid little attention to quality control on containers. CEP's examination of past records reveals very few inspections of irradiated fuel containers during manufacture (NRC, 1981a). In 1966, the AEC Division of Reactor Development and Technology requested that the Oak Ridge National Laboratory develop a guide for engineering standards to be used in design, fabrication, testing, inspection and maintenance of irradiated fuel casks (Sandia, 1978a). The resulting ***Cask Designers Guide*** served as the basis for development of the next group, or "second generation," of irradiated fuel casks. In 1967, the present cask testing standards were adopted. They define tests which the Nuclear Regulatory Commission (NRC) employs to certify irradiated fuel casks. As Box 5-1 shows, these standards were first conceived in 1961, and have remained essentially unchanged since that time.

When the AEC was divided into the Nuclear Regulatory Commission (NRC) and the Energy Research and Development Authority (ERDA), later renamed the Department of Energy (DOE), the authority to certify shipping casks was given to both of them. While DOE has maintained certificates on about a dozen casks (Sandia, 1978), NRC is the primary "watchdog" on cask standards and certification, maintaining a list of over 20 different containers, many of which are one-of-a-kind (NRC, 1979a). Two models, the NAC-1 and NLI-1/2, are used for highway shipments of commercial irradiated fuel, while two others, the IF-300 and the NLI-10/24, are designed for rail shipment of commercial irradiated fuel.

In 1973, DOT and NRC worked out a memorandum of understanding for enforcement of cask standards and shipping rules which delineated each agency's responsibilities. Each agency employs inspectors who are sent out regularly to enforce regulations and to recommend fines when they discover violations. In general, NRC was to handle container compliance and security matters. Most of the agency's inspection and enforcement effort has been directed toward cask fabrication (NRC, 1981a). DOT agreed to keep an eye on strictly transportation aspects such as the vehicles, drivers and other items not related to casks (44 FR 38690). Unfortunately, DOT, as is discussed later, has made little effort to oversee the shipping of irradiated fuel (DOT, 1981a). The DOT division responsible for overseeing the shipment of all hazardous materials, the Materials Transportation Bureau (MTB), has only nine full-time inspectors for the United States. They are responsible for enforcement of rules governing over 21,000 different container manufacturers. In 1979, MTB inspected only 158 of these (GAO, 1979).

Other federal agencies have also participated in rule-making and enforcement. The Environmental Protection Agency, for example, performed a study (EPA, 1974) on irradiated fuel transport. The agency supplied testimony and feedback during development of recent NRC and DOT rules and studies affecting movement of irradiated fuel through urban areas. Its rules on the permissible amounts of radiation exposure for the public and radiation workers apply to uranium mining and not to transportation of uranium ore. The NRC, not EPA, sets standards for transport workers. Enforcement of radiation release levels while vehicles are in transit is in the hands of the DOT sub-agencies: the MTB, Coast Guard, Federal Railway Administration and the Federal Highway Administration (which encompasses BMCS).

Despite this broad federal authority, as of September 1981, over 200 jurisdictions (states, counties, cities and transportation authorities) have passed their own laws on radioactive materials shipments, many of them focused on high-level shipments such as irradiated fuel (see Table 3-2). The primary impetus for such extensive activity, spearheaded by the City of New York and upheld by the courts in 1976 and 1982, was fear of an accident which could cause widespread radioactive contamination.

While the rules of some jurisdictions replicated the permit system established by New York City, most of the non-federal regulations were less restrictive. Oak Ridge National Laboratory, which monitors such laws, found that the vast majority merely require pre-notification of impending shipments. Others, however, have limited the hours of transit or required a police escort. A few have demanded extra safety features. Several have placed outright bans on shipments (Fore, 1980).

The effect of the proliferation of such rules became obvious when Brookhaven, in order to avoid New York City, began sending irradiated fuel across Long Island Sound by ferry to New London, Connecticut, to be trucked around the New York metropolitan area on its way to Savannah River. New Londoners were not pleased. They passed their own version of the New York City law. The impasse was not broken until 1978, when the State of Connecticut passed a law that permitted irradiated fuel shipments with pre-notification and a state police escort. Under Connecticut's constitution, the state law preempted (superseded) New London's law. Brookhaven could have reinitiated shipments, but chose not to do so. It preferred to wait for a broad new rule DOT had been preparing in order to overturn the New York City law and those modeled on it.

Before DOT could act, and in order to enhance the security of shipments, the NRC established a rule governing routing of irradiated fuel shipments which went into effect in July 1979. Informally known as NUREG-0561 (after the manual distributed to explain its promulgation), it required that all routes be approved by the NRC in advance, that certain highly populated areas be "embargoed" (off-limits to irradiated fuel shipments), that extra guards be used under certain circumstances and that contact with law enforcement officials be developed (NRC, 1980a). Although instituted to reduce chances of sabotage, this rule also pleased many who were concerned about accidents in urban areas. The EPA, in a letter to DOT dated December 22, 1978, stated:

> "Routing restrictions limiting the truck transport of such radionuclides to non-urban areas could substantially reduce (probable in all cases by at least a factor

> of ten to 1,000) the potential consequences of an accident and the overall radiological risk of such shipment (without substantially increasing the cost of the shipment or without unduly restraining the movement of such material)" (GAO, 1979).

Amended regulations later allowed shipments to pass through urban areas if an extra set of guards was added, but the extra cost and inconvenience were enough to keep most irradiated fuel trucks out of cities. For security purposes, the NRC attempted to keep all irradiated fuel routes secret, but this rule was overturned by a Congressional mandate that the routes not only be made public, but that they be published twice yearly (NRC, 1981b) and that governors of states through which shipments were about to pass receive prior notification to allow state police along the route to be alerted (10 CFR 73.37(f)).

The battle finally culminated in DOT's creation of HM-164, in which routing of all radioactive materials, with special attention to large quantity shipments, such as irradiated fuel, is delineated. Replicating the NRC's general routing criteria, HM-164 also preempts any non-federal law that requires pre-notification, extra guards or safety features; restricts the time of travel; or forces use of an alternative mode of transportation (such as rail or barge) (DOT, 1980). For radioactive materials, HM-164 replaced an earlier DOT rule for all hazardous materials (49 CFR 397.9) which required avoidance of populated areas, if possible. When HM-164 was promulgated, an exception to 49 CFR 397.9 was made for radioactive materials. As a result, all hazardous materials *except* radioactive shipments must avoid urban areas if possible. While DOT has considered modifying its stand on pre-notification (in the light of the NRC notification of governors), many communities with local laws have begun seeking methods to continue restricting shipments by circumventing HM-164. Michigan, for example, found that its bridges were higher than the required 40-inch drop test for cask puncture and banned any container that could not meet a drop from the Mackinac Bridge which links the Upper and Lower Peninsulas (SECO, 1982). The Mackinac Bridge, part of a planned shipping route from Canada to Savannah River, is 200 feet above the water (MBA, 1982). Other suggestions have included requiring liability insurance on all carriers of irradiated fuel (a costly item worth avoiding by changing routes) and obtaining automatic pre-notification through the use of roadside radiation monitors. Several organizations have begun a drive to recall all irradiated fuel casks, citing defects in manufacture and testing as the reasons.

Members of Congress have also been critical of HM-164. For example, Senator William Proxmire (Democrat, Wisconsin) has attacked the time-of-day preemption provisions of HM-164:

> "State and local officials, not the bureaucrats, are likely to know best at what time Interstate 94 in Milwaukee is the most congested and therefore poses the most risk for a shipment of radioactive material. The Department of Transpor-

> tation, however, imposes no time-of-day restrictions on the shipments of radioactive material. If Wisconsin wanted to impose a time-of-day restriction—to prevent, for example, radioactive wastes from being trucked through Milwaukee during rush hour—that restriction would be preempted as inconsistent with DOT regulations. When Congress passed the Hazardous Materials Transportation Act in 1975, it envisioned that Wisconsin and other states *would* have a say in developing routes for radioactive materials" (Proxmire, 1981).

Not to be overlooked in a discussion of federal agencies and state and local governments is the key role played by concerned citizens on a local level. Local transport ordinances have often come about because activists urged local and state governments to put these transport rules into effect.

Communities continue to be concerned about the ability of shipping casks to withstand accidents, local input on routing, and the level of emergency preparedness. Without attention to these local concerns about the safety of irradiated fuel shipments, HM-164 will be subjected to many court challenges. (One, brought by New York City, has been discussed in Chapter III.) As will be detailed later in this chapter, the dangers are real and there are viable options to avoid them. Regulations such as HM-164, in attempting to over-rule local safety ordinances, appear to exacerbate the conflict, rather than resolve it.

## Commercial Responsibility for Shipments Is Divided

Traveling through the maze of federal and other regulations are several firms which, together, form the foundation of the nuclear transport industry. The division of responsibilities is almost as complex as the regulations they must follow. In order to clarify the handling of irradiated fuel, let us follow a specific shipment along its route from reactor to storage.

While the fuel is at the reactor site, the utility has complete responsibility. Licensed by the NRC, the utility must adhere to NRC rules or face fines or possible revocation of its license. The latter option has never been utilized. Loading of the fuel into a cask is performed by utility employees, as is loading of the cask onto a truck. At this point, however, two new characters enter the play. The utility contracts with a shipper to handle the paperwork, permits, etc. and to coordinate the shipment. The shipper is also responsible for compliance with rules governing surface contamination of the cask, the restraints by which the cask is fastened to the trailer, and selection of the route. The shipper contracts with a carrier, who supplies the truck and driver. The shipper bears some responsibility for choosing a competent carrier, but it is generally the carrier's job to adhere to local, state and federal traffic regulations.

In the event of an accident, the general procedure is for the driver to call his employer (the carrier), who then calls the shipper, who, in turn, informs the utility and the cask supplier (the shipper often also supplies the cask). In some cases, local police have been notified by the driver, the carrier's dispatcher or the shipper—or some combination thereof. There has occasionally been confusion about who will represent the various parties should an accident involve a liability claim, but a recent NRC ruling (NRC, 1981c) requires the carrier to hold a license as temporary possessor of the irradiated fuel, thereby indicating some overall control during unforeseen circumstances. While only indirectly affecting a state's coordinated response to an accident, this ruling raises an interesting problem: does a state have the power to remove a leaking cask and store it away from public exposure when the state has no license to "possess" the fuel? The NRC resolved the conflict with another ruling by which states having prior arrangements with the NRC (so-called "Agreement States") could obtain licenses to temporarily possess irradiated fuel in order to protect the public. Only half the states are Agreement States, however, so the responsibility of handling an irradiated fuel accident is still a matter decided by local police and the carrier at the accident scene.

Emergency preparedness is covered in greater detail in a later section of this chapter. It is sufficient at this point to point out that many private companies and governmental jurisdictions are involved in any shipment, that attempts have been made to clarify boundaries of responsibility, but that each time an ambiguity in the authority structure is clarified by a new ruling, the maze gets more complex—and new ambiguities appear.

While the NRC effectively regulates the licensees and the certification for shipping casks, the carriers and drivers are subjected to very few direct requirements by the agencies; rather, the licensees must vouch for their safe performance. A draft report by the National Academy of Sciences on management of nuclear waste (NAS, 1981) sums up the regulatory situation as follows:

> "While HM-164 and the NRC sabotage regulations do give some attention to truck and driver safety and conditions on the open road, the focus of the former is *relief* from local and state requirements, while the focus of the latter is espionage and sabotage, not conventional (and more likely) accident safety for the highway-using public and surrounding communities. Thus, at present the carriers are not subjected to special requirements for their special cargoes. Without stressing the analogy to air traffic control beyond reasonable limits, we think it is permissible to analogize the current regulatory framework for waste and spent fuel to a hypothetical situation in which *air freight customers*, not air traffic controllers, have been made primarily responsible for the safe air transport of hazardous materials. As 'traffic' increases, such a situation will not likely be allowed to continue" (NAS, 1981) (emphasis added).

While several companies, both large and small, entered the nuclear transport field in the heyday of nuclear power (the late 60's to early 70's), Nuclear Assurance Corporation and Transnuclear Inc. are now the two prime shippers in the United States. (The major companies involved in transportation are shown in Table 5-2.) The receivers of irradiated fuel are primarily government laboratories or government laboratories under private contract (such as the Savannah River Plant in South Carolina, and INEL), private laboratories under government contract (such as Battelle Memorial Institute in Ohio), and nuclear plant manufacturing facilities (Babcock & Wilcox in Virginia, General Electric in California, and Westinghouse in Delaware). Transshipment of irradiated fuel has also been done (see Table 5-1). Virginia Electric Power Company has asked for NRC permission to ship between the Surry and North Anna reactors in Virginia.

General Electric operates an AFR in Morris, Ill., the only private facility assigned to this service which still receives irradiated fuel. Allied General Nuclear Services owns an unused pool at its non-operating fuel reprocessing plant at Barnwell, SC. About 162 tons of irradiated fuel from five utilities is stored at West Valley, NY, in a pool now owned by the State of New York. The state has asked the five utilities and Nuclear Fuel Services to remove it and has sued these companies for $1 billion.

With a few more than a dozen companies involved in shipping, handling or storing, the irradiated nuclear fuel transportation business is not a very large industry at this time. However, the industry could expand rapidly, should the government construct or purchase AFR's.

## Local Responsibility for Public Health and Safety

The last group of actors in the movement of irradiated fuel are the people who actually handle emergencies: the police, fire, health and environmental agency staff. One industry report noted that "the single most vulnerable area in emergency response is at the local level" (AGNS, 1978).

Several studies have revealed the limitations placed on such groups by budget, untrained staff, geographic dispersal and the lack of concern on the part of the federal DOT. Even in those states which are most advanced in handling radiation accidents (such as New Jersey, which maintains radiation response teams with specially equipped vehicles), there is no immediately available equipment for detecting the spread of radiation by monitoring air samples of gaseous releases (CEP, 1982). Most states have radiation protection departments, but few have had any experience or training in handling large quantity shipments containing the fission products found in irradiated fuel. Typically, their experience involves the handling of short-lived medical isotopes or sealed sources of radiation used in industrial applications. Neither requires the equipment or preparation needed in an irradiated fuel accident.

Local responsibility for emergency response is primarily vested in the fire departments. Many have the standard "Cutie Pie" hand-held radiation monitor among their equipment. This monitor is useful, and fire departments along transport routes should be equipped with them. But they are insufficient for air-monitoring. The vast majority of fire fighters are volunteers with little professional training in handling *any* hazardous materials (IAF, 1979). Of the full-time professionals in the field, one representative of the International Association of Fire Fighters pointed out that:

> "...fire fighters are presently not prepared to ... contain radioactive spills, or even evacuate communities without jeopardizing their own health and safety. Training programs—even in communities with nuclear power plants—do not prepare fire fighters in the event of an accident." (IAF, 1979)

To date, there have been no serious releases of radiation during any of the accidents involving irradiated fuel casks. Still, the level of awareness of the potential dangers by drivers, state police and others during these accidents, and the confusion that has taken place during minor accidents, gives cause for concern. Even after hazardous material accidents have happened, fire departments may be no better prepared to handle the next one. One year after a train accident involving a hazardous waste spill in Somerville, Mass. the co-chairman of the hazardous materials committee of Massachusetts Fire Chiefs stated that emergency response is still trial and error. In the May 1980 Somerville accident, water was poured on a phosphorus trichloride spill, sending up an acid cloud that forced the evacuation of 30,000 people, sending 70 to hospitals. The Somerville Fire Chief commented, "Boy, we learned the hard way that was the wrong thing to do." Yet the DOT emergency guidebook still incorrectly recommends using water on this chemical. Several other disturbing examples were uncovered in CEP's research, one of which, the Rockingham, NC accident, is described in Box 5-2. In that accident, in which 17 emergency teams responded, confusion and conflicting authority prevented effective action.

# Casks Meet Performance Standards

Design standards for spent fuel casks have their roots in the *Cask Designers Guide* (ORNL, 1970a). Developed at Oak Ridge National Laboratories, the guide was based on sketchy data collected from the late 1950's and early 1960's,* which described accident scenarios and conditions that radiation material containers must withstand. Before publication of the guide, federal agencies utilized standardized tests which privately developed cask designs had to pass before being used. Since past accidents often involved collisions, punctures and fires, standard tests describing these conditions were considered sufficient to define the severity limits (see Box 5-1).

Initial attempts to set cask standards ran into three problems. First, the data on accident severities was (and remains) spotty and of questionable accuracy (see Chapter VI). Because drivers involved in accidents at high speeds are often killed, speed just prior to the collision is often difficult to establish. Survivors who had significantly exceeded legal speed limits often downgraded the speed they reported to avoid self-incrimination. Similarly, no one equipped with temperature-measuring devices is poised and waiting for an accident involving a fire. Damage analysis gives clues about vehicle speed or fire temperature, but other factors such as cargo distribution and fire duration make definitive determinations impossible (Sandia, 1976).

The second problem involves accident severity *distribution* (the frequency of occurrence of accidents of different severity) and whether a cask must be designed to withstand every conceivable accident. An absolutely indestructible cask would be extremely expensive to fabricate and might be unwieldy on normal shipping routes. As an example, assuming that the worst accident occurs least often, one might opt for a cask that can withstand 99.9 percent of all accidents and expect that mitigating factors, such as low population density, will reduce the impact of the 0.1 percent of accidents that could result in a cask leak. If the distribution of accident severities were known, the conditions encountered in the worst of the 99.9 percent of all accidents could then be employed as the cask certification standards. Once again, however, the lack of an adequate data base limits the ability to predict the percent of accidents that will result in breaching a cask.

A third and less well defined problem is the process by which compromise is built into the development of any regulation or standard. Cask manufacturers, for example, mindful of fabrication costs, lobbied successfully to reduce the proposed length of the fire test from one hour to 30 minutes (see Box 5-1). Once a set of cask standards had been agreed upon, the regulatory agencies still had to define the methods by which casks were shown to be in compliance. According to present rules, actual casks need not be physically tested. No cask presently in use in the U.S. has been tested. Analysis is accomplished through mathematical methods and computer codes that are acceptable to the Nuclear Regulatory Commission [49 CFR 173.398 (d)].

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*Since 1973 more consistent and complete data have been collected under the Hazardous Materials Information System.

A sequence of four standard tests was developed:

- Impact test—30-foot drop onto a flat, essentially unyielding horizontal surface,
- Puncture test—a drop of 40 inches onto a six-inch diameter vertical steel bar,
- Fire test—a 30-minute fire at 1,475°F,
- Immersion test—immersion in three feet of water for eight hours.

## Impact Test

The impact test consists of a 30-foot drop of a cask onto a flat unyielding surface such as to sustain the maximum damage, usually on edge. However, the cask itself is not dropped. The impact is modeled by a computer. The 30-foot drop is equivalent to a 30 mph crash into an unyielding barrier. For an object as massive as a shipping cask, no test barrier or any other surface is truly unyielding. But some real-life surfaces, such as bridge abutments, are relatively immovable, and trucks clearly go much faster than 30 m.p.h. According to Sandia National Laboratories, a 30 m.p.h. crash into an unyielding barrier is equivalent to a crash into a concrete wall at 39 to 42 m.p.h. (Sandia, 1980a). Some organizations, such as the Insurance Institute for Highway Safety, recommend a speed governor on trucks carrying radioactive materials. They noted that

> "trucks carrying radioactive materials can by design operate on the roads of this country at speeds greatly in excess of the 55 m.p.h. speed limit. The violence of crashes at such excess speeds can easily defeat regulations designed to protect such cargoes (and people and property and their environments) moving at lower legal speeds" (Haddon, 1980).

(See Chapter VI and Box 5-3 for a fuller discussion of impact velocities.)

Accidents at low velocities could also release water and steam, contaminated by radioactive crud from the surface of fuel rods or particles from leaking fuel. Assuming that a fluid-filled cask struck a bridge abutment sideways, a government report found that an impact of only 12.5 m.p.h. would be sufficient to force the pressure release valve to open (PNL, 1978), thereby creating a pathway for the escape of radiation. This scenario has not been adequately explored despite the fact that damaged fuel has often been shipped to research laboratories.

## Puncture Test

In the puncture test, a cask is dropped 40 inches onto a six-inch diameter steel plug. Though the diameter and geometry of the plug are reasonable, they are also arbitrary. As with the impact test, the cask itself is not dropped. Mathematical formulas model cask puncture and have been questioned from several standpoints by members of the industry. Most noteworthy and alarming were the results of a 1980 analysis of punctures of shielded radioactive materials containers performed at the Lawrence Livermore Laboratories (LLL). In assessing the manner by which cask designers substantiate puncture resistance in casks, the report stated: "Existing test data is inadequate and analytical methods, largely empirical, are crude and unreliable . . . The empirical formulas do not give designers the insight into puncture phenomena they need to produce a rational, safe design" (NRC, 1980b). According to LLL, the puncture formulas are "crude and unreliable." These strong criticisms have been independently supported by a former NRC engineer (Shieh, 1980). Yet, since no casks are physically tested, the cask designer must rely on these calculations to verify that a cask can satisfy the tests.

The results raised a new issue related to the temperature at which the puncture occurs. The present rule (49 CFR 173.398(c)(2)) assumes normal outdoor temperatures prevail at the time of the drop. The 30-minute fire follows the 40-inch drop test in the test sequence. The LLL tests showed that significantly less force could cause a puncture if the surface of the cask had been heated to 400°F (NRC, 1980b). In other words, heated surfaces could be punctured more easily than cool surfaces. It follows that a cask could more readily be pierced during a fire than before a fire, as the present test assumes. Is such an event credible?

During the fire test conducted by Sandia, the heat of the flames weakened the frame of the railroad car and its metal supports, causing it to topple on its side (Sandia, 1980b). In light of that occurrence, a 40-inch fall onto debris appears possible. Similarly, a cask need not leave a trailer in order for it to topple the trailer onto its side when tires burst due to a fire's heat. It would seem logical to reverse the order of the fire and 40-inch drop tests, if the intent of the regulations is to subject a cask design to the worst credible accident.

## Fire Test

About 1.6% of all truck accidents involve fires. In a fire, the valves and seals might be damaged (PNL, 1978) and radioactive materials released. The temperature and duration of the fire are the key parameters. Conceived in 1961, the general fire test is 30 minutes at 1475°F. Again, computer modeling, rather than an actual physical test, is employed.

As with truck velocity impacts, we lack the basic data on temperature and fire duration. While the Summary Accident Reports by the Bureau of Motor Carrier Safety (BMCS) are complete in terms of accident type, frequency of fire, cause of fire, and property damage, they do not describe fire size, intensity, duration and combustible materials (Sandia, 1978b). To obtain this information, a large number of assumptions (26 in all) were made, some well based and others not, on the amount of fuel available and dispersed, the length of time the fuel burns, the percentage of accidents involving fuel, etc. According to Sandia, most hydrocarbon fuels yield measured flame temperatures for open burning between 1,500°F and 2,400°F, with an average of 1,850°F, and "flame temperatures of most of the other expected combustibles fall in that same range, generally towards the low end" (Sandia, 1978b). The references cited discuss burning of cross piles of wood and paper arrays, which have lower flame temperatures, but not chemicals such as acetone, acrylonitrile, benzene, xylene, 1-3 butadiene, n-butane, ethane, propane, toluene and 1-butene (see Table 5-3). This is a serious omission because all of these have maximum (adiabatic) flame temperatures between 3,820°F and 4,275°F. While the actual flame temperatures will be less than the adiabatic flame temperatures, temperatures still greatly exceed 1,475°F. A major increase in the use and transportation of these and other chemicals has occurred since 1961, when the cask certification requirements were first conceived (see Table 5-4). The table, which is a representative sample of the major combustibles produced in the U.S., shows a 10-fold increase in the production of ethane, and dramatic increases in the production of others in the 20-year period between 1960-1980. It seems clear, therefore, that the general fire test temperature should be raised substantially.

Since BMCS has no data on fire duration, this information was deduced entirely from a range of assumptions, including how much fuel was involved in cars, trucks and tankers, the spread of this fuel and the firefighting response. Sandia's calculations assume JP-4 jet fuel. They also assume that the presence of fire fighters does not appreciably shorten the fire duration. (This is an assumption that is not based on actual data.) However, based on these assumptions, Sandia projects that 50 percent of the truck accident fires will burn less than eight minutes (Sandia, 1978b). Yet some well-documented fires have burned considerably longer, particularly when a tank truck was involved. The April 1982 fire in the Caldecott Tunnel, Oakland, California, burned for an hour and three-quarters at an average temperature of 1,850°F (Oakland, 1982). The results are shown in Figure 6-1. There are approximately 35,000 fire departments in the United States with about 2,100,000 fire fighters. Approximately 90 percent of fire fighters are volunteers and these are mostly in the rural and suburban areas (GAO, 1979), where the response to a fire would be quite different from one in an urban area. For example, in Duchesne, Utah, on an NRC-approved shipment route, the volunteer fire department covers an area 60 by 80 miles.

To test the Sandia "eight-minute" conclusion, CEP conducted a small random telephone sample of fire departments in rural, urban and suburban areas. Fire chiefs were clearly reluctant to specify an average fire duration, but preferred instead to state the minimum and maximum range as shown in Table 5-5.

While the minimum fire is rather short, the survey indicates that the maximum fire can extend up to three hours and 23 minutes. CEP does not consider this telephone survey a sufficient basis for standards setting. It is not a weighted average based on a sizable number of fires, but an average of a small number of phone call responses. But it does establish that the Sandia fire duration statistics are too low.

A fire at 1,850°F for only 15 minutes could overpressurize a cask and cause the rupture disk to fail two-and-one-half hours later (PNL, 1978). Battelle Labs believes a reduction in risk level could be attained if corrective action were taken to cool the cask within two hours of the accident. This would entail having trained emergency personnel available at the accident scene within two hours (PNL, 1978). A hotter fire could cause the rupture disk to fail sooner.

Because of the presence of loaded railroad tank cars containing 10,000 to 40,000 gallons of combustibles, long-duration, high temperature fires as a result of a train accident are quite possible. There are again limited data, but Sandia estimates (Sandia, 1978b) about one percent of railroad collisions and derailments result in fire. As it has for truck accidents, Sandia has set up models to predict the temperature and duration of railroad fires. Some of the assumptions of the model, and the conclusions, are realistic and others are highly questionable. For truck accidents, aircraft fuel, JP-4, was used in the model, with an average temperature of 1,850°F, ranging between 1,500°F and 2,400°F. Sandia has ignored the higher temperature fires of hotter burning combustibles (see Table 5-3). Sandia also estimates the probability of adjacent cars catching fire at 20 percent, thereby rendering it highly unlikely in the model that cars, two or three removed, could ignite. This ignores the fact that in a derailment accident many cars are pushed together so that cars not initially adjacent could burn too. Under the assumptions of the model, 50 percent of train fires burn longer than 30 minutes. Fires at temperatures greater than 1,800°F are easily attainable, as demonstrated by the train wreck in Paxton, Texas in which four burning acetone tank cars were juxtaposed with other flammable materials (NTSB, 1979b). From knowledge of the adiabatic flame temperature, the average surface temperature for many combustibles can be shown to exceed 2,200°F. While it is unlikely that the adiabatic flame temperatures of the chemicals listed in Table 5-3 would be reached all over a cask, it is not unusual for gas temperatures to reach 80 percent of the maximum flame temperature (PIRGIM, 1974) and for localized spots of a cask to reach 70 percent of the gas temperature (Sandia, 1980b,c). Heat transfer is not a linear process, but within this narrow range of temperatures it is possible to conservatively postulate surface temperatures reaching as high as 50 percent of the maximum flame temperature. For materials such as ethylene oxide (commonly moved in large quantities by train), 50 percent would yield an average surface temperature exceeding 2,200°F (Perry, 1973).

The Federal Railway Administration has been concerned that casks could be exposed to fires lasting longer and with greater intensity than the fire test. The Carter Administration seriously considered recommending that the rule be changed to a 100-minute fire at 1,600°F, which is the standard used for tank cars carrying LPG (NAC, 1977). This change would be a marked improvement, but not a sufficient one.

The length of the fire test also is open to question. In testimony before the Interstate Commerce Commission, an official of the Southern Railway Company stated that, during a three-month period, he could recall three fires that burned longer than 24 hours (Bradley, 1976). If toxic chemicals were also released in a derailment, as has often occurred, fire fighters might not be able to reach the accident scene. The fire in a Livingston, La. train wreck on September 28, 1982 *burned for more than five days* and forced the evacuation of 3,300 persons. In the tank cars were poisonous and explosive substances including heavy oil, tetraethyl lead, methyl chloride, caustic soda, toluene diisocyanate. Since the fire department could not extinguish the fire with water because of the presence of sodium (sodium and water react violently), nor with foam because it would contain the heat, causing tanks to rupture, they could only allow the fire to burn. As the Sheriff's office described it, "The flames are tremendous. You can stand a half mile away and hear the roar" (NYT, 1982). It is unlikely a shipping cask designed to withstand a half-hour fire could survive such a train accident. Even when professional fire companies are involved, truck fires also can burn well beyond the 30-minute limit. In 1980, for example, a gasoline truck struck a garbage truck on the New Jersey Turnpike in Newark. The fire burned out of control for nearly two hours after the collision, despite efforts by several nearby fire companies (NY Post, 1980).

A government sponsored study examined fires that lasted longer than the regulatory length (30 minutes) and somewhat hotter (1,850°F) than the regulatory temperature (1,475°F). Computer simulations indicated that temperatures approaching 1,600°F could be reached inside the cask hours *after* a fire had been put out (PNL, 1978) because the massive cask can retain so much heat. This level is dangerously close to the ignition temperature of the zirconium cladding (1,688°F). If the cladding were in the presence of moisture or even in air, it could rapidly oxidize or burn, releasing hydrogen gas inside the cask. If sufficient oxygen were present, this could create an explosive hydrogen bubble which could shatter the fuel cladding. Even without an explosion, the oxidized cladding would be weakened or cracked, providing a direct path from the fuel to coolant or air within the cask.

Because extended fires are a relatively rare occurrence, the industry appears not to be overly concerned (Sandia, 1981) (see Box 5-4).

According to the same government study (PNL, 1978), a fire of shorter duration at the average highway fire temperature could also cause a release of radioactive materials. At 1,850°F, a 15-minute fire could cause the rupture disk on the cask to fail. A 30-minute fire could cause the valves and seals to fail as well. These scenarios provide excellent reasons for pre-notifying local fire departments about irradiated fuel shipments. With advance notice, the fire departments can be prepared, particularly volunteer companies, and the duration of the fire can be limited.

Despite the presence of water, fires on shipboard can burn for long periods of time because a fire can render the water pumps inoperable. To avoid this contingency, redundant systems can be installed (see discussion of Japanese irradiated fuel ship in Chapter VIII). Fire would be a particularly serious problem on large container ships which may have combustible materials and irradiated fuels adjacent to each other (Cohendy, 1980). Lacking combustible materials, barges would not be expected to have fires of long duration unless in a collision with a tanker ship.

## Immersion Test

CEP's literature search found no questions raised regarding the ability of a cask to survive an eight-hour immersion in three feet of water, as specified by the cask testing standards. Transportation personnel have stated that the test is an unrealistic simulation of a cask falling into deep river. However, the test was not designed to simulate such an accident. Its purpose is to assess the possibility of the nuclear reaction inside the cask becoming "critical" as a result of the neutron-reflective properties of a surrounding mass of water (ORNL, 1970a). The discussion does indicate that there is no test to analyze the amount of radiation that would escape from a cask dropped to the seabed floor while being transported by ship or barge. One study concluded that a cask must reach a depth of 800 feet before its pressure relief valve would be forced open (AIF, 1978), but there is no regulation directed at controlling releases from a cask as a result of deep submersion. The Japanese require casks to withstand immersions as deep as three miles (see Chapter VIII).

# Additional Recommended Performance Standards

## Torch Test

Further searches in the literature support the view that the basic accident standards (drops, fire, immersion) do not adequately assess all accident scenarios. No test is required, for example, to assess the effect of a torch fire on a cask, as might occur if a train with both liquid gas and irradiated fuel were derailed. If the tanker is pierced and the leaking gas ignites as it shoots out, a high-temperature flame directed at a small section of the cask could be created. While casks containing lead shielding are designed to allow the lead to expand during a fire, the space needed in a torch fire may be insufficient unless a large amount of the lead melts. If one spot on the cask is heated to a very high temperature very rapidly, the lead will expand at that spot, pressing against the outer steel shell with tremendous force. Such a problem was indicated in another recent study (Sandia, 1980d) in which it was found that tests caused failures of the cask seal or shell "due to local stresses (when) lead and/or gamma shield material could melt locally, away from expansion volumes, and the outer shell could rupture. . . ." Loss of the lead shielding could increase the radiation emissions of the cask by a factor of 500 or more (HEW, 1970). It could also expose the inner steel shell to the blast of the torch. In contrast to the absence of torch test standards for casks, a torch test is presently required of some types of railroad tank cars, during which a 2,200°F flame blasts against the car at 40 m.p.h. for 30 minutes (49 CFR 197.105-4(c)). Some preliminary tests are now being conducted at Sandia, but none of the casks in use today are designed to withstand a torch fire.

## Crush Test

Another change that is needed in the regulatory structure is a crush test to simulate the immense forces involved with train car pile-ups and with collisions between barges and larger ships. While high speed impacts are possible for trucks, studies indicate that 59 percent of train accidents occur at speeds less than 30 m.p.h. (91 percent at speeds less than 50 m.p.h.) (NRC, 1980c). The impact speed in a collision involving an irradiated fuel cask would probably be less than the above velocities. In a derailment, for example, the derailed cars would slow down rapidly; the cars farther back in the train might even stop without leaving the track. With this kind of train accident modeling, Sandia concludes that the impact velocity for 95 percent of the cars in a train would occur at less than five m.p.h. (Sandia, 1978b). However, as with truck accidents, no significant data are available to support or contradict these impact calculations.

Very large crush forces can occur if an irradiated fuel cask is crushed underneath derailed cars. The structural members of a railroad car and the massive weight involved imply application of considerable force, estimated by Sandia as unlikely to exceed 50 tons (with a probability of one such event per billion car-miles) (Sandia, 1978b). The Sandia report fails to evaluate the crush force applied to a cask that is pinned between railroad cars in an accident. A more recent NRC-sponsored study (NRC, 1980c) shows that the crush forces exerted on a cask that is pinned between railroad cars can be as much as 550 tons, a factor of 2.6 times the force resulting from a 30 m.p.h. impact, which is all the cask manufacture standards require. This could produce cask deformations up to 22 inches, which the rail shipping casks may be unable to withstand (NRC, 1980c). While the probability of such crush forces was unspecified, the NRC considers it to be low (see Box 5-5).

Although barge shipping accidents have not been well studied, it is clear that the major forces acting on an irradiated fuel cask would result from crush and fire. Because no U.S. barge shipments of irradiated fuel have taken place, these are not analyzed in the standard references [(NRC, 1977); (Sandia, 1978b)]. A recent NRC study on crush (NRC, 1980c) has a section on crush environments on *container* ships, but not on barges. Container ships have much thicker hulls than those on barges. Although barge shipping appears highly promising as a means of avoiding shipments through some major metropolitan areas, it is CEP's conclusion, based on the paucity of data, that it must be studied much more thoroughly. This includes preparing an environmental impact statement detailing the short- and long-term accident consequences along probable shipping routes, and designing prototype barge vessels.

Crush tests have been "under consideration" by DOT and NRC for five years (NRC, 1977), are supported by many members of the industry (Sandia, 1979), and "would increase the current level of protection for both crush and impact" (NRC, 1980c), but are still in the talking stage. One NRC consultant suggests a test in which a weight four to twelve times heavier than the cask would be dropped from a height of 30 feet onto the cask as it lay on an unyielding surface (NRC, 1980c). The weight would have to be 400 to 1,200 tons to adequately test a train cask, and performance of the test would present unique engineering problems.

## Missile Test

To simulate the crash of an airliner into a shipping cask, the West German government requires that a cask withstand the impact of a one-ton missile moving near the speed of sound (650 m.p.h.). This missile test is in addition to the four standard cask tests. The CASTOR cask, which is manufactured in West Germany, is actually physically tested with a projectile fired out of a long cannon. While the probability of an airplane striking a shipping cask must be extremely low, the test, because of its severity, does lead to a cask design which is especially rugged. The CASTOR cask is constructed of solid nodular[*] iron, with walls 15¾″ thick, in contrast to U.S. casks, with walls six to nine inches thick, much of which may be lead (which is much softer than iron). (See Chapter VIII for a discussion of the CASTOR cask.)

## Valve Design Standards Insufficient

To prevent the cask seal from rupturing under pressure, cask designers build in a pressure-relief valve that vents coolant. Except for Regulatory Guide 7.6, a revised version of Section III of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Code, which is used for the design of *stationary* nuclear power plant components, no specific NRC guidance or design criteria exist for the design and manufacture of shipping cask valves. The adequacy of ASME standards for cask design has never been determined. Since the ASME Code is written for stationary systems, it does not specify the deceleration forces for which the valves must be designed. Sudden impacts may cause the cask valve to open. It has been noted by a citizens group (Sierra Club, 1980) and by industry personnel as far back as 1970, that "once this (pressure) valve is actuated, it is extremely difficult to reseat . . ." (ORNL, 1970b).

In June 1981, five years after the casks were put into service, the valve manufacturer for the four General Electric IF-300 shipping casks informed GE that the valves failed during operational testing due to a "generic problem" affecting all IF-300 casks. The IF-300 is the cask most frequently used for rail transport. While the valve would open under pressure, it would not close again, thereby creating an avenue for the continued release of radioactive material. All IF-300 casks have now been restricted to shipping older irradiated fuel in dry state, where relief of pressure will not be necessary (GE, 1981).[**] For a dialogue on valves, see Box 5-6.

The NRC was unable to furnish any evidence that it had inspected the IF-300 casks during their manufacture. The tests conducted on shipping casks by Sandia (discussed below and in Box 5-9), in which trucks crashed into barriers at 84 m.p.h., never adequately tested the valves. The casks at Sandia were not pressurized to the levels attained during normal operation, which are far below accident pressure conditions.

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[*] "Nodular" iron is cast iron in which graphite is present as tiny nodules with characteristic structure.

[**] In September, 1982, the IF-300 was entirely removed from service for BWR fuel because the lack of criticality under all conditions could not be assured with the fuel basket employed.

Another problem with cask valves and seals involves their performance in a fire. Because the valves and seals are made of a Teflon-like coating, the failure threshold for closure drain valve and vent valve seals is 30 minutes in a fire of 1,850°F. The failure threshold for a rupture disk* is a mere 15 minutes at the same temperature (PNL, 1978). "Data on Teflon valve seals indicate that failure would occur if the *cask* temperature [not fire temperature] exceeds 540°F" (PNL, 1978). Even the all metal seals may not hold (AGNS, 1978).

CEP concludes that valve design criteria and performance are sorely deficient. ASME valve standards must be formulated, and valves tested under accident conditions.

## Weld Test Quality Control Too Lenient

Computerized certification tests are based on the assumption that the cask is perfectly constructed. Tests which check casks for welding imperfections, however, have been criticized in the literature. Tests usually include physical and x-ray inspection of welds and are referred to as non-destructive tests (NDT) because they do not involve damage to the item being inspected. Published in 1978 (after the fabrication of almost all existing casks), a study by Sandia Laboratories noted that:

> "it is difficult to understand the lack of imposition of state-of-the-art NDT methods on critical cask elements such as closure weldments and tie-downs on some of the LWR casks. In most instances, the cask design agency and the cask fabricator had access to knowledgeable in-house NDT personnel and equipment that they used routinely to process ASME code vessels" (e.g., high pressure tanks) (Sandia, 1978a).

These tests were not performed on casks because the NRC regulations did not require them. Further, once the cask is constructed, the ultrasonic tests can no longer be performed. Since some of the current casks did not have ultrasonic tests performed "on critical weldments following initial fabrication," it is impossible to know now if the welds were done properly. The same Sandia study analyzed the two main types of weld tests with the following conclusion:

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*A rupture disk is a diaphragm in the pressure relief line that is designed to fail if the cask is overpressurized.

> —Ultrasonic weld testing does not work well with austenitic steel (the primary steel used in many irradiated fuel casks): "False defect indications and masking of real defects in the weldments . . . have raised real doubts as to the credibility of an ultrasonic method for such weldments."
>
> —Two-view radiography "is questionable as to its validity and efficiency when compared with ultrasonics." One cask expert estimates that the smallest crack detectable by this method is 3/16 of an inch, and therefore a cracked weld could go undetected (Shappert, 1980).

In the course of CEP's study, it was learned from the author of the welding study that the older NAC-1 cask welds were not properly examined for defects (Ballard, 1982). (For an exchange with Nuclear Assurance Corporation on the subject of welds, see Box 5-7.) Thus, it appears that at least some welds were not thoroughly checked, that they cannot now be checked, and that the testing methods are, in any case, open to question. Casks of uncertain construction may be traveling the nation's highways. Whether this critique of weld tests applies to other commonly used casks, such as the GE IF-300 and NLI-1/2, has not been established.

## Cask Fabrication

Irradiated fuel casks are certified for compliance with federal regulations by NRC or DOE, depending on the user of the cask. In light of the problems mentioned previously, a host of additional problems with the NAC-1 cask have been revealed (see Box 5-8). After studying inspection reports for casks in current use, it is the conclusion of this study that:

1. Both agencies have monitored cask fabrication on the basis of papers filed by the cask manufacturer and have rarely examined the fabrication while it was in progress.
2. The documentation for casks that have been on the road for many years either is not available or has been lost or destroyed.
3. Manufacturers have occasionally failed to construct casks according to drawings or specifications. The NRC's response has been to change the license to allow the alteration after the fact instead of requiring compliance with the original design.
4. Casks have been manufactured or altered improperly and then used for extended periods without awareness by any of the federal agencies. Discovery of the alteration has been made by purchasers or by

a laboratory testing a cask, sometimes after it had already been taken out of service due to obsolescence (see Box 5-8).

5. State-of-the-art techniques for detecting welding failures have not always been used. They probably cannot be applied to casks in use.
6. The response time of the NRC to serious questions about cask capability is far too slow.

It is worth noting that the record-keeping on irradiated fuel casks is occasionally sketchy. Some reports are missing from NRC files. Documentation that could influence these conclusions may have been improperly withheld from public disclosure.

## Cask Tests at Sandia National Laboratories

Data provided by the nuclear transport industry raises serious questions about the quality of the casks and the tests used to certify them. When confronted by such criticisms, some transport proponents refer to the full-scale tests performed by Sandia National Laboratories as the basis for claiming that the casks are overbuilt and are safe, regardless of division within the transport community over details.

The Sandia tests, which include crashes of a fuel truck into a barrier at 62 and 84 m.p.h. and of a train broadside onto a shipping cask, were captured on film and have been shown to thousands of people around the world. The tests themselves were useful in validating computer predictions of impact. However, in order to show that shipping casks are safe, the film portrayals have been less than truthful, according to federal safety officials (see Box 5-9).

## Sandia: A Potential Conflict Of Interest?

Sandia National Laboratories, primarily a defense contractor, has also performed transportation studies for both the NRC, which regulates the nuclear power industry, and DOE, which is charged with promoting it. Sandia thus rejoins two functions that were deliberately separated by Congress in 1974, when the AEC was divided into two agencies. Could an agency which claimed shipping casks were safe and which produced a film as documentation really be an objective, disinterested contractor for evaluating the transportation industry?

As an example of this conflict, CEP found the following program statement by Sandia:

> "State and local governments are becoming increasingly active in trying to control radioactive shipments through their jurisdiction. . . . At the minimum, it will be necessary to keep track of laws and ordinances as they are passed so that limitations on systems can be accommodated in systems designs. Optimally, it is desirable to know the content of such legislation *before it is passed in order that DOE and/or industry can interact with the lawmaking body* to secure the most favorable regulations consistent with public safety." (Sandia, 1980d) (emphasis added)

In practice, the head of Sandia's Transportation Technology Center has visited over one hundred communities, often appearing before local legislative bodies to show the Sandia film, "Accident Safe." The purpose was to convince legislators that no local ordinance regulating transportation of irradiated fuel is needed to protect public safety. The DOE and local utilities paid for these trips.

The NRC is aware of the possibility of conflict of interest. The agency contracts through a different Sandia project director than is used by DOE. The NRC also has employed different contractors as an independent check of Sandia's work (NRC, 1982c). Nevertheless, questions regarding Sandia's objectivity remain, especially when it injects itself into the political arena.

## Transport Accident Record

There has never been a large enough release of radioactivity from a shipping cask to seriously affect the public. However, a study by Sandia for the NRC (NRC, 1980e) did acknowledge one leak, and research for this study has revealed several others. One involved a release of "30 to 40 gallons of contaminated water" (AEC, 1975), another "a release of coolant from a railroad cask" (NY DOH, 1976), and two others, in AEC-sponsored (not private) shipments, resulted from the failure of cask tie-downs (AEC, 1961). A more recent incident involved failure of a valve to maintain a seal (NRC, 1981d), but no quantity of leakage was specified. CEP's effort to find records of leakages was minimal, only involving notations when they were found in literature searches on other topics. Other leaks may be documented in internal memoranda of the agencies concerned with irradiated fuel shipments (AEC and later NRC, ERDA and DOE). Such a search is advisable. Military shipments are classified and no listing of any leaks associated with those shipments would be made public.

Another disturbing item uncovered during the document search for this study was the effect of the lack of central processing of transport accident data. The most severe irradiated fuel shipment accident, the Peach Bottom truck crash of December 8, 1971, does not even appear in AEC's list of operational accidents (AEC, 1975). In this accident the driver lost control of the truck on a two-lane highway. As the truck veered off the highway, the cask flew off the trailer into a field. While the driver was killed, the cask itself was undamaged. Several incidents listed in a five-year survey of accidents in transport (AEC, 1961) are also not listed in that compilation. The NRC did not have a means of retrieving transport-related items from its inspection and enforcement reports until 1981.

While these incidents are not of a magnitude to seriously affect the public, many incidents of contamination of the cask surface have been found, some of which could affect the health of transport personnel and technicians. There is no indication that these events have been collected and categorized for later analysis of trends or solutions. Several are discussed in Box 5-8. These cask contamination incidents show a pattern. Casks previously decontaminated to allowable levels arrive at destinations with contamination levels 100 times higher. Radioactivity from the fuel pool water, trapped in metal pores, is apparently shaken loose during transport. (To prevent this problem, the Japanese use a protective bag while loading the cask within the pool, that keeps contamination from reaching the cask (Curren, 1980).

## Federal Department of Transportation Responsibilities

To ensure that "defect-free" casks are constructed, improvements are needed in cask standards, in the tests to certify that casks meet the standards, and in the design requirements for safety-related components such as valves, the inspection of cask manufacturers and the enforcement of regulations. Meanwhile, casks of uncertain construction are traveling the nation's highways and rails, and the industry continues to believe that shipping casks are "virtually indestructible" (AIF, 1980). In its regulation of licensees, the NRC emphasizes "the one safety factor which the licensee has in its control at the point of origin—cask integrity" (NAS, 1981). The National Transportation Safety Board has criticized this fixation on the cask and its contents:

> "By structuring the regulations on the dangerous properties of these individual commodities and focusing largely on preventing the escape of the commodities from their containers, the interactions of other elements of the transportation system which affect the risk, such as changes in the probability of an incident, the severity of the consequences or the population at risk, are not systematically evaluated. The development of regulatory measures designed to assure the transportation of these dangerous goods does not expose persons or property to an appreciable danger requires that such efforts focus on the transportation system in which these goods are moving and *all* its constituent elements, not just two (dangerous cargo and its containers) elements of this system," (NTSB, 1971).

Excessive dependence on the integrity of the shipping cask has led to minimization of the significance of other important aspects of the shipping complex: emergency planning, trailer safety, driver training, routing and pre-notification of local communities, all of which are under the jurisdiction of DOT. Some situations appear to fall between the two sets of regulations (see Box 5-10).

## DOT Inspections

The quality of the vehicle used to transport irradiated fuel is the regulatory responsibility of DOT. Yet despite repeated requests, DOT was unable to provide a single irradiated fuel shipment inspection report for brakes, trailer hitches or any other vehicle-related safety features. No inspection reports were available for other modes of transport either. It is apparent that DOT has never inspected vehicles involved in irradiated fuel shipments and that the agency depends on NRC inspectors to find problems during their occasional visits to reactors. NRC inspectors check the cask, documentation and (perhaps) the tie-downs, if they are an integral component of the shipping cask. They are not trained to inspect the vehicle itself. Subdivisions of DOT responsible for this activity are the Materials Transportation Bureau (MTB) and the Bureau of Motor Carrier Safety (BMCS). MTB has five full-time inspectors for all types of shipments, BMCS has nine. The bulk of highway inspections are performed by part-time inspectors who are often unaware of regulations involving hazardous materials (Senate, 1979). Due to the lack of personnel, the National Transportation Safety Board has concluded that BMCS "cannot conduct an effective program aimed at identifying and removing unsafe vehicles and drivers from the road" (NTSB, 1981). On the only occasion BMCS was ever called upon to exercise its authority to inspect an irradiated fuel shipment, it declined involvement due to a lack of equipment (i.e., a Geiger counter) (DOT, 1979). With such poor inspection capability, it is unlikely that many vehicle failures will be detected unless they are a factor in a major accident. While no serious accidents have taken place, luck appears to have played an important role in the first decades of the "perfect" record.

## Cask Tie-Downs

The DOT and the NRC share regulatory authority over the securement of shipping casks to trucks and rail cars. Since the NRC is responsible for design of the shipping casks, any tie-down ***which is an integral part of the cask*** must satisfy NRC rules. Other tie-downs, however, such as chains which are attached to the trailer or rail car itself, must satisfy DOT rules. This division of authority has led to a gaping hole in the regulations. While the NRC requires a tie-down which is a structural part of the cask to satisfy a 10g force in the direction of travel (ten times the weight of the cask (10 CFR 71-31 (D)), DOT requires that the tie-down attached to the trailer itself satisfy only a 1.8g force (49 CFR 393.100 (c). A chain must satisfy a 1.8g force, as it attaches to the cask or to the trailer or flat bed (see Fig. 5-3). The tie-downs employed in the Sandia test were much more substantial (compare Figs. 5-1 and 5-2).

No tie-down could withstand a high-speed accident (Brooks, 1982). A severe highway accident in South Carolina with a truck carrying low-level radioactive wastes (the 1.8g force tie-down requirement is the same as for irradiated fuel shipments) serves as an example. In that collision, the chains snapped and two casks flew off the trailer (NRC, 1982d). Thus, in calculating the damage to the cask in a transport accident, NRC regulations assume the tie-down device fails and all impact is absorbed by the cask. Yet, if all components of the tie-down system had to withstand a 10g force, the trailer or flat car and the tie-down device itself would absorb more of the collision impact. When discussing cask tie-downs, one expert in the area stated that "the infrequency of failure so far appears to be due to good fortune rather than consistently good planning" (Langhaar, 1968).

More disturbing still is the fact that some DOT personnel with regulatory authority in this area seem unaware of the tie-down regulations. For example, the only hazardous waste inspector of the Federal Rail Administration for the entire New England region said that he had not "seen anything written" about tie-down requirements for hazardous material (Hayes, 1982). As shown in Box 5-11, state regulatory personnel also seem unaware of the regulations.

## Driver Training Requirements

DOT regulatory laxness carries over to driver training. While DOT training requirements are more specific for truck carriers of irradiated fuel than for other transportation modes, they are still too general. It is the carrier's duty to make the regulations effective by thoroughly instructing the employees, but DOT provides no advice on how the carrier might accomplish this. Without more specific rules, enforcement is impossible. No DOT inspections have been carried out, and no fines have been levied.

To supplement general driver training requirements, and as part of routing rule HM-164, DOT promulgated new driver training requirements for the transport of radioactive materials. They are intended to be "consistent with that for cryogenic (very cold) liquids," where drivers must be knowledgeable in handling cryogenic material, e.g., the manual venting of gas and logging of cargo tank pressure. The cryogenic regulations, however, were never implemented. The new rules also require that the driver pass biennial written tests administered by the carrier, not the agency, on DOT radioactive material regulations, and on "the properties and hazards of the radioactive material being transported and the procedures to be followed in case of an accident or other emergency." Whereas NRC regulations are supported by NRC Regulatory Guides, the DOT staff has not provided any written guidance. According to one DOT official (Loucks, 1982), most of the training takes place on the job, which, for a truck driver, could hardly be the "written training" specified in the rules. All drivers must satisfy general requirements in reading and speaking the English language (sufficiently to converse with the general public and to understand highway signs and signals in the English language). They must be able to determine whether or not the cargo has been properly located, distributed and secured in or on the motor vehicle. The driver must also pass a road test administered by the carrier and a written examination on the Motor Carrier Safety Regulations (49 CFR Part 390-97).

According to another DOT official (Allen, 1982), there are no standardized tests on hazardous materials to supplement the driver's training required by the regulations. In fact, he noted that it would be "discriminatory" to ask drivers specific questions about the materials they will carry. He didn't indicate how this discrimination would arise, but it would appear that the tests could only discriminate against those persons ignorant of the rules and the nature of hazardous materials.

NRC driver training and written tests are directed at safeguarding shipments against attack—warding off saboteurs. None of the training provided by the NRC (or DOT) prepares a driver to protect the public health and safety in case of an accident. Although the requirements for training railroad and barge workers about hazardous materials are less specific (49 CFR Subpart A, 134.7), railroads that handle nuclear materials have been found to be more diligent in training their employees (Brooks, 1982). Training programs incorporate hazardous materials education. Conrail issues a rule book called "CT 225" which delineates the preparation of all types of material for shipment. The barge carrier is responsible for training its employees to do the same work. The Federal Railway Administration is responsible for enforcing DOT rail regulations, and the U.S. Coast Guard, barge. However, as the rules are unspecific, it would be difficult to determine non-compliance.

## Emergency Plans

If a transportation accident involving irradiated nuclear fuel does occur, most communities will not be equipped or trained to handle it. Past experience shows that local emergency response teams are disorganized, ill-equipped and inadequately trained. A vivid example of this lack of coordination among response agencies is demonstrated by the Rockingham, N.C. train accident described in Box 5-2. If the shipment had been of irradiated fuel instead of uranium hexafluoride, along with fuel oil and other combustibles, the consequences would have been much more grave. Had the local fire department been prenotified, it could have arrived at the accident scene sooner than 35 minutes after the fire began.

Following the Three Mile Island reactor accident (March 1979), the NRC required emergency preparedness plans for fixed facilities (i.e. nuclear power reactors) (FEMA, 1981). No local plans, however, are required for a transportation accident emergency. The Federal Emergency Management Agency (FEMA), established in 1979, has recently published a guide on local emergency response plans for a transportation accident (FEMA, 1982), but compliance with the guide is entirely voluntary. The federal government has not pressed communities to buy equipment and train their employees, nor has it provided even a portion of the necessary funds. Other than publishing planning guides and emergency handbooks, the role of the federal government has been minimal—training a small number of local fire, police and civil disaster personnel, and maintaining a standby response team under the Interagency Radiological Assistance Plan (IRAP), formed in 1961. While the IRAP response teams are usually helpful, equipment and personnel must be marshalled and transported after the accident happens (AGNS, 1978).

The training programs of the federal agencies—DOE, DOT, FEMA and NRC—are described in Table 5-6. CEP has not reviewed these programs as to their effectiveness in preparing local emergency personnel for a nuclear transport accident. Despite the multiplicity of programs, and whatever their quality, the main problem is that few local and state personnel have actually received instruction. Only 5,000 firemen have been directly trained by DOT (GAO, 1980). The agency claims 100,000 firemen may have received some second-hand training. DOT estimates that each trained fireman will train 20 additional firemen, but does not substantiate the claim. Since there are about 35,000 fire departments in the U.S., with about 2,100,000 fire fighters (90 percent of whom are volunteers), only 0.2 percent or fewer of fire fighters have actually been trained. This is clearly inadequate. The Chairman of the International Association of Fire Chiefs stated that "as a rule, at least 75 percent of the fire fighters in a unit should have training in hazardous materials emergency response" (GAO, 1980).

A study by Indiana State University (NRC, 1980f) also reports on the lack of preparedness of firefighters and other local and state emergency personnel. In three-quarters of the states that responded to their survey, one-third or less of the firemen knew how to operate radiological response instruments. In 30 states (out of 35 returning questionnaires), less than a third of the local police departments had even one officer who knew how to use radiological emergency equipment. In three states, no local police knew how to operate these instruments. Yet police departments in general are not volunteer-staffed, as are most fire departments. Half of the states responding to a GAO questionnaire were unable to estimate how much nuclear material is transported through their jurisdiction each year (GAO, 1979). Thus, as shown by surveys, DOT, the agency mandated by Congress to ensure safety in transport of hazardous materials, and other federal agencies, are not training enough local personnel to cope with emergencies.

## Emergency Preparedness: State Governments

State governments are responsible for developing emergency response plans and teams, to coordinate communications, and to negotiate agreements with municipalities and neighboring states on emergency procedures. These plans must necessarily include equipment and drills.

To assess the level of preparedness for transportation accidents, CEP surveyed state officials on agency responsibilities, equipment, preparatory conditions, degree of preparedness and coordination of multi-level agencies. Thirty states responded. The results are shown in Table 5-7. All states had radiation monitors for beta and gamma radiation, 83 percent had air monitors for sampling gaseous releases, only 30 percent had shielded clothing and equipment, while only three percent had portable cranes large enough to lift shipping casks.

A 1978 accident in Illinois points out the need for portable, heavy duty cranes. After a trailer shipping a cask broke in half, it took many hours to find a crane, prompting one NAC official to suggest stationing such cranes near irradiated fuel shipping routes. Several state agencies pointed out that highway departments, highway contractors and universities have the specialized clothing and equipment that could be used for emergencies. Their immediate availability, though, was questionable.

The CEP survey also established that almost three-quarters of state radiological chiefs had attended training courses. When it came to actual experience, only 13 percent of the officials had actually inspected a cask and only 13 percent claimed to have carried out drills simulating a transportation accident. Without drills, it is difficult to know whether plans will actually work as an integrated whole when the need arises. Judging from past radiological accidents, local personnel such as fire, police and ambulance crews, are usually the first to respond to an accident. Officials with greater knowledge about radiation, usually from state agencies, will typically arrive on the scene hours later (NRC, 1980g). The response, particularly to fire, could be greatly improved if local officials were informed in advance of the time and route for irradiated fuel shipments. In rule HM-164, DOT attempted to deny pre-notification. The issue remains clouded due to the NRC requirement that governors be pre-notified.

In general, truck drivers have a direct communication link with state police and could use it to summon aid in the event of an accident. The carriers, shippers and drivers could play a more significant role in mitigating the severity of accidents. But drivers are not well instructed under DOT regulations and enforcement procedures. If the truck accident is severe, the driver may not be able to assist.

## Emergency Preparedness: Local Needs

In order to provide adequate response to a radiological emergency each locality and state should be prepared in the following areas: 1) Proper equipment for first responders at the scene of the accident, 2) clean-up procedures, 3) training programs for local and state officials and emergency personnel, 4) dissemination of information among agencies, 5) public education and information, 6) emergency communications systems on common radio frequencies, and 7) evacuation plans (NRC, 1980f). Much of this equipment and preparation can also apply to hazardous material accidents and major natural disasters, such as earthquakes, floods and tornadoes.

According to FEMA, basic equipment for personnel who are first to arrive on the accident scene should include monitoring instruments (for alpha, beta and gamma radiation), mobile air samples, and personnel dosimeters for all response teams. Cranes for lifting casks would be necessary, as would vehicles capable of transporting emergency teams and their equipment to and from the scene of the accident—ground vehicles, aircraft, watercraft, and/or ambulances to transport the injured, traffic control equipment, and communications equipment. In general, first responders to emergencies have relatively unsophisticated equipment (NRC, 1980g). Since much of this equipment may already be present, it need not be purchased. However, a coordinated response plan would need to ensure that the equipment is available when needed.

Almost all states rely extensively on police radio or telephones for emergency communication. Only a few state and local police departments are on common frequencies. In some areas, county and state police mobile vehicles are unable to communicate with each other since they are on different frequencies.

However, for adequate emergency communications, redundant systems using a variety of communications resources are needed. They should include multichannel microwave repeaters, dedicated phone lines, radio-telephone capability and access to several different radio frequencies (NRC, 1980f). In addition to the above recommendations by FEMA, and in order to facilitate communications among local officials, radio beepers should be carried by key local persons.

If radiation is detected at an accident site, additional equipment may be necessary for cleanup, according to FEMA. This might include protective clothing for cleanup personnel, perhaps including half-face respirators and airtight suits with self-contained air supply, large clear plastic bags, radiation warning signs, ropes and labels, remote handling tongs and shielded waste containers, vacuums, earthmoving and construction equipment, including cranes, and scrub brushes. States and localities that were investigated had very little decontamination and clean-up capability. In many cases, shovels and protective clothing were all that were on hand (NRC, 1980g). Many states and localities believe cleanup procedures are the responsibility of, and are relying upon, the shipper or carrier. Emergency personnel such as Civil Defense, fire, police and health departments, hospitals and ambulance services, need to be trained in the use of this equipment. A workable plan must be developed and practiced. This should take place for every community along every nuclear transport route. Counties or adjacent communities may be able to share the expense.

The federal agencies shown in Table 5-6 can provide training for local personnel. Training should be carried out, with periodic drills on a regular basis, and new personnel should be trained when they begin employment. Courses should include basics on radiation and contamination, DOT and NRC regulations on transportation of radioactive materials, procedures for personal safety, general responsibilities of carriers, shippers, and licensees during emergencies, and the hazards of different radioactive materials.

Literature on radiological accident response, including evacuation plans, should be distributed to residents along nuclear transport routes, as is now required for communities near nuclear plants. This literature could also apply to hazardous material accidents and to natural catastrophes. Plans should be developed for issuing emergency information and instructions to the public living in the affected area.

## Public Response to the Lack of Preparedness

Communities are clearly unprepared to handle irradiated fuel transport emergencies and are fearful for their health and safety. DOT, the prime transportation agency, and FEMA should be responsible for training and equipping local personnel to respond to transportation accidents. Rather than meeting these health and safety concerns, DOT, through its regulation HM-164, routes the nuclear shipments on Interstate highways through local communities. Under these circumstances, it is understandable that communities are passing ordinances banning or restricting such shipments. In contrast to DOT's effort to restrict data on shipments, a government contractor has stated that

> "emphasis should be placed on working with local officials to make them aware of plans for shipping nuclear waste materials through their area. A task in the programs should be to plan to provide assistance, if requested, to establish or upgrade local emergency response preparedness plans" (BNWL, 1977a).

The National Academy of Sciences adds that "the general public appears basically rational in its responses and that a pervasive distrust exists of the institution which manages nuclear power and wastes" (NAS, 1981).

The plethora of local regulation, while appearing to be a breakdown in the political system, is, according to the National Academy of Sciences, just the opposite, namely "The successful working of the system that Framers (of the Constitution) purposely designed to inhibit action, to permit the articulation of diverse views and to protect the rights of minorities" (NAS, 1981). The communities and state governments which have passed nuclear transport ordinances are shown in Table 3-3.

The National Academy of Sciences summed up the nuclear transport situation in the following way:

> "A primitive regulatory framework currently exists for the transportation of high level wastes. The federal governmental agencies involved defer to each other, with primary responsibility essentially delegated via form of 'private regulation' to the NRC's reactor licensees. The states are fighting preemption, but mainly in order to gain the right to ban or restrict waste shipments. They apparently would prefer uniform affirmative federal regulations for transport safety through DOT regulations. The DOT, however, defers to the NRC, which in turn refers the problem to the waste generators. In this vacuum of responsibility, where no level of government, federal agency or private utility has the strong incentive to act decisively, adequate safety regulations can only languish. As the frequency of shipments accelerates, however, the probability of serious accidents will increase. Thus, the panel recommends that existing federal regulation of highway transport be drastically revised (a) to reduce the current near-complete dependence on the casks' ability to prevent release of radioactivity, (b) to eliminate both redundancies and incompleteness in the NRC-DOT regulations, and (c) to address the needs of states to control safety on their highways." (NAS, 1981)

In the vacuum that presently exists, communities can go farther to protect their interests. The costs of training, equipment, and emergency personnel are high, apparently in excess of what communities can or wish to afford. Congress, however, could impose a tax on nuclear waste shipments, dispensing the money to pay for training and equipping local personnel. This tax would be passed on to the users of nuclear-generated electricity, a more equitable system than the present method by which local communities along the routes bear almost the full risk and cost for emergency preparation.

If DOT and Congress do not address the safety concerns of local communities, the communities can institute a certificate system by which the shippers are charged for all reasonable emergency preparation costs. In May 1982, Illinois enacted a $1,000 fee for each irradiated fuel shipment to cover some costs for preparedness and oversight. Local communities can then assume the function which the federal DOT has abdicated by certifying that casks, trailers, drivers and tie-downs meet federal standards. In short, local communities can fill the vacuum, ensuring their own health and safety.

## Transport Economics

The total cost of shipping irradiated nuclear fuel differs from one method to another, but is a small part (less than 1% ) of the overall cost of generating electricity by nuclear reactors. Safety improvements to shipping casks and emergency training for local personnel are a fraction of the shipping cost, yet significantly reduce the risk of a transport accident.

In this section we discuss what must be factored into the total cost of shipping irradiated fuel by barge, truck and rail, taking the Maine Yankee reactor as an example. Because rental is the largest cost component, comprising up to 60% of the total cost, the fastest shipping method, truck, is the least expensive. Transporting irradiated fuel by barge is more expensive than by other modes largely due to the time consuming step of switching the cask from barge to truck or train. Since a barge cannot deliver a cask directly inside the receiving facility of an AFR, federal depository or reactor, the cask must first be transferred to truck or rail. Of 75 reactors presently licensed, 62% have rail sidings and 77% are accessible to waterways.

If, instead, large dry storage casks are used for transportation, there is no cask rental charge because the utility is already the owner of the cask. The transport methods that carry more casks in just one trip—rail and barge—then become the least expensive.

## Conveyance and Turnaround

The journey of an irradiated fuel cask consists of two phases: conveyance and turnaround time. The costs of conveyance are a function of 1) the cask rental and 2) the barge and tug, rail (perhaps special-use train) or truck rentals, including crew or driver wages. The cask, truck and barge rentals, and crew and driver wages are calculated on a daily basis, while the train costs are by the ton-mile (plus a per-mile fee for special-use trains). The largest component of the cost is the cask rental fee, which depends on the distance and speed of the shipping method. We assume an average barge or train speed of seven m.p.h., 24 hours per day (168 miles per day, because the caskcar mainly sits in the railyard), and an average truck speed of 35 m.p.h. In Table 5-8, cask and conveyance rental costs (in 1980 dollars) and travel speeds are given.

At the end of each trip, the cask must be brought into the reactor or off-site facility and the fuel assemblies unloaded from the shipping cask into the pool, or from the pool into the shipping cask. This is the turnaround phase. For truck or rail, the cask is taken directly into the receiving facility and transferred by crane to the underwater cask receiving area, where the fuel is unloaded. A barge's turnaround time includes the additional step of unloading the cask from the barge to a rail car or truck by either the roll-on/roll-off or the lift-on/lift-off method (see Figure 5-4). These methods are time-consuming. For two casks, the heavy haul truck (HHT) method, jacking up the rail car and replacing the rail car's iron carriage with rubber dollies, has an estimated turnaround time of 7½ days at each end (AIF, 1978).

The cost factors in this turnaround phase include cask and barge/tow/crew rental costs and turnaround equipment costs and time. Equipment rental costs to move casks from a barge to a truck or train, such as a tractor, rubber dollies, rigging and radiation monitoring equipment, must be included.

## Maine Yankee

As an example of these transport economics calculations, consider the case of The Maine Yankee nuclear reactor located in Wiscasset, Maine, on the Sheepscot River about 34 miles northeast of Portland. The barging of irradiated fuel from Maine Yankee will take the fuel out to the Atlantic Ocean via the Sheepscot River. It will follow the coastline and the Intercoastal Waterway, shown in Figure 5-5. The barge would follow the Jersey coast, around Cape May, through the Delaware Bay, up the Delaware River, through the states of Delaware and Maryland by way of the C & D Canal, down through Chesapeake Bay, along the coast to the Savannah River near Barnwell, S.C. Only the last 15 miles of the 1,736-mile journey would be by HHT or rail according to the Atomic Industrial Forum (AIF, 1978). Conveyance over the 1,736 miles will require 10.5 days of barge travel each way, with a turnaround time at each end of 7½ days. By rail, the distance between Barnwell, S.C. and Maine Yankee is 1,230 miles (PNL, 1980) requiring 8 days each way. For the cost of a special-use train, we take 36¢ per ton-mile (IAEA, 1981). For truck, the total mileage is 1,190 miles, requiring 3.5 days each way. The turnaround time is one-half day at the AFR and one day at the reactor, or a total of 8.5 days per round trip. The yearly transportation costs for all three methods are shown in Table 5-9. While barge shipping (because of the long distances involved) is more favorable for the Maine Yankee plant than it is for other reactors, truck remains the least expensive method, followed by rail, then by barge. Although the yearly cost differentials are large, the costs do not differ by more than 0.02¢/kwh, less than 1% of electrical generating costs.

For a single yearly shipment, where transport occurs with large storage casks, so that the cask rental is assumed "free," the shipping costs for barge and rail are comparable to each other and half the cost of truck shipments, as seen in Table 5-9. This is due to two factors: (1) a single one-way barge or rail shipment, and (2) the absence of a cask rental charge. If there is no daily cask rental charge, the utility can take time to load the yearly supply of irradiated fuel onto one train or one barge. Since shipping costs for a train are per ton-mile, the cask conveyance costs are roughly the same, but a major saving occurs in the use of only one rather than nine special-use trains. Similarly, there would be one barge shipment rather than four and a half per year. Since barges are rented by the day, not by the ton-mile, this would be major cost saving. The cask rental would be zero, but intermodal transfer and equipment costs in unloading nine casks would be the major cost factor for barges.

These calculations can be carried through for each reactor, given the barge, rail and highway distances (PNL, 1980). The general ranking given in Table 5-9 would remain the same for all reactors, although the barge option under standard transport becomes much less favorable for reactors with shorter shipping routes. For single yearly shipments, with no cask rental fee, rail is less costly than barge, and both are less costly than truck shipment. The cost saving for railroad and barge transport, compared to truck, would be greater yet if several years' supply of irradiated fuel were shipped in one train or one barge.

From these calculations, CEP finds that dry storage can significantly *decrease* costs of managing irradiated fuel when the casks are also used for transportation. It is therefore an economically desirable option in addition to the advantages stated in Chapter VII.

## Rail and Barge Feasibility

Despite advantages of rail and barge methods, major hurdles must be overcome before they become safe, viable and widely-used options for transporting irradiated fuel in the U.S. Both modes can accommodate much larger casks than are now in use. The economics of transporting larger quantities in a single shipment (an entire year's discharge from a reactor, for example) offer advantages over present methods. The use of larger casks would also allow longer cooling periods for the fuel before transport, an important safety factor. Some reactors, however, are not equipped to handle larger casks, (see Table 3-1), and it is not clear they can be backfitted. Further, regular trucks could not carry them, though heavy haul trucks could, in most cases, move these casks to the nearest rail spur or barge dock.

Government documents have supported the use of large storage casks and of special-unit trains to carry them. "A new generation of casks, specifically designed for long-cooled fuel should be developed" (PNL, 1980). The REA and CASTOR casks have been developed to handle larger loads, which, because of their weight, can be transported longer distances only by barge and rail. According to one government document, "the concept of using a unit train to take up to several years' worth of a reactor's spent fuel in one operation has merit and it should be investigated" (PNL, 1980). The unit train has several additional advantages: shorter transit time, expert traveling cask handling crews, and an inventory of spare parts for casks and handling equipment (PNL, 1980). Government reports have also taken notice of public opposition to greatly increased highway travel through urban areas: "the advantage of lessened impact on the public from fewer shipments is an important consideration" (PNL, 1980). To avoid major population areas, such as New York City, barge travel will become a necessity:

> "an intermodal rail/water or road/water transport system could open up crucial alternative routing in the event that state or local authorities continue to restrict the overland transport of spent fuel" (PNL, 1980).

However, unless attention is paid to several important problems with both barge and train transport, these two options will not be viable.

Sixty-two percent of operating reactors have a rail siding, but not all of these extend into the fuel storage building. Because of crane limitations, only 53% of operating reactors can use rail transport. Seventy-seven percent have access to navigable water, but many of these have no docking facilities. At San Onofre a 38′ sea wall stands between the reactor and the sea. For reactors without rail access, rail sidings would have to be constructed, or fuel could be transferred by heavy-haul truck from the reactor to the nearest siding. It is almost always possible to construct a rail bed. Unless expansion of rail access is required by federal regulation, it is unlikely to occur. "Development of (the needed) private railroad trackage by the electric utility is typically economically prohibitive and generally unfeasible" (NAS, 1981).

The construction of a navigable canal is less universally feasible. Intermodal transfer to the nearest water with adequate dock facilities would be needed. Furthermore, if the irradiated fuel goes directly to a federal depository, it is unlikely that the depository would be near a navigable waterway. The sites under active consideration are at or near Richland, Wash., Nevada Testing Site, and Moab, Utah. Thus, transfer would be needed not only at the reactor, but also at the termination point. Each transfer increases the cost of the trip.

There are several limitations to rail shipments of irradiated fuel. Rail and barge casks are much larger than those shipped on trucks. One model (IF-300) holds seven PWR assemblies while the other (NLI-10/24) holds ten PWR assemblies. Very large cranes are required to manipulate the casks while in the fuel pool area and deeper pools are needed to allow complete coverage during loading. There must be greater heights above the pools to accommodate loading onto rail cars or heavy-haul trucks.

The severity of a railroad accident is often determined by the materials in the train's cargo. CEP's analysis of hazardous materials involved in rail fires found that 75 percent of them were capable of flame temperatures exceeding 3,000°F (DOT, 1981b). This is twice the regulatory standard temperature by which casks are evaluated. Large quantities of combustibles occasionally caused fires greatly exceeding the 30-minute regulatory standard. They occasionally involved large volumes of toxic materials, thereby complicating fire fighting. The potential for a severe fire environment may also have increased in recent years due to the increased amount of combustible materials moved by train: between 1977 and 1980, the quantity of such materials more than tripled. (AAR, 1982).

As a result of these concerns, several railroads required that special trains be used exclusively for irradiated fuel. This rule, proposed by the Association of American Railroads (AAR) in 1974, recommended that trains shipping irradiated fuel contain no other cargo and "when a train handling these shipments meets, passes or is passed by another train, one should stand while the other moves past no faster than 35 mph" (AAR, 1974). An additional fee or tariff would be levied on the owner of the irradiated fuel to cover the expenses involved. Some rail lines decided to avoid shipping irradiated fuel completely and issued notices to that effect. In 1976 the Interstate Commerce Commission (ICC) intervened to settle the dispute between the railroads and the nuclear industry by calling hearings before an administrative law judge on the legal merits of the special tariffs on nuclear shipments. In several different cases the judge decided that the railroads could not choose what cargo they would and would not ship and directed the railroads to come up with acceptable rates for irradiated fuel shipments. During the lengthy proceedings, ICC prepared, at the request of the railroads, an environmental impact statement on the effects of rail shipments. It concluded that while "there would be serious environmental effects associated with a release of radioactive materials in the event of a train accident, the likelihood of such a release occurring with regular train service is remote. Due to the added safety precautions, the likelihood of a nuclear incident on a special train is even more remote." (ICC, 1977). Other analyses, including one performed by the AEC, "indicate that a reduction in accident rate occurs, perhaps by as much as a factor of 7" (NRC, 1977) when special trains are used.

The railroads were not happy with this ICC decision, and continue to support the use of special trains. As recently as 1979, at a nuclear transport industry gathering, a railroad official indicated that "if the nuclear industry and government shippers wouldn't go along with the railroads' wishes, their shipments would sit and rot in the freight yards" (Sandia, 1979).

There is a reason to accept at least some of the railroads' views on extra care for irradiated fuel shipments by rail. Years before the NRC instituted the same rule (ICC, 1976a), the Department of Energy (then known as ERDA) required special attention for naval irradiated fuel shipments, restricting their speed to 35 m.p.h., indicating their placement in trains and at rail sidings, and mandating periodic contact with an escort. As most trains travel over 50 m.p.h. during at least a portion of each journey, with speeds up to 70 m.p.h. (ICC, 1976b), this speed restriction reflects special attention on the part of a federal agency. The railroads have also supplied data demonstrating that special trains move irradiated fuel more quickly than regular trains, even with their speed restrictions (ICC, 1976a). This seeming paradox is explained by the fact that full-size trains spend a great deal of time in freight yards. The average rail car spends only 12 percent of its time in motion (NAC, 1977). The average speed of regular rail traffic is therefore only six m.p.h. (NAS, 1981). Special trains moving directly from origin to destination, without adding or dropping cars, can avoid these layovers. By maintaining a higher average speed of 35 m.p.h., special train service yields a reduction in shipping time of over 75 percent. (ICC, 1976a). In examining regular freight, and the potential for large-scale rail use, the NAS found that

> "at any given time there would be a number (perhaps a large number) of railcars carrying irradiated fuel waiting in marshalling yards (i.e., freightyards) across the country. Some of these yards—Chicago, for example—are likely to be in densely populated areas. Moreover a single car may wait a week or more. This means for all practical purposes railroad marshalling yards would become de facto short-term AFRs. In a fully operating system, hundreds of rail casks might at any given time be 'stored' in these yards" (NAS, 1981).

The reduction of freight yard residence time by special trains has several salutory effects. It reduces cask rental costs to the point where, according to the National Academy of Sciences study (NAS, 1981), trains could be more cost-effective than trucks. It reduces public and worker exposure since most of such exposures occur while fuel shipments wait in freight yards (BNWL, 1977b). Further, while most studies indicate that risks associated with rail shipments are already low, special trains do have the potential for "reducing the frequency of exposure of spent fuel casks to major fires. . ." (BNWL, 1977b). Special trains would also simplify the problems of monitoring and control, ordinarily necessitated by the highly decentralized nature of the railroads, and the transfer of shipments between rail carriers.

Rail beds in this country may not be capable of handling future fuel casks weighing over 100 tons (NAC, 1977). Weight restrictions have been imposed because the rail beds are in poor condition in exactly those regions where the concentration of nuclear plants is highest. Rail service deterioration has been characterized as a "severe problem" by one nuclear industry study (NAC, 1977). Though the rail accident rate has improved in the past two years (FRA, 1981), and though the rail accident rate is lower than for other methods [1.5 rail-car accidents per million rail-car miles (train), 9.7 accidents per million miles (ship + barge) and 2.5 accidents per million miles (truck)], rail-bed deterioration has led to an increased rail accident rate over a twenty-year period. The amount of rail trackage has steadily decreased over the years and some rail lines have gone bankrupt, thereby threatening the existence of special rail routes in the future. The only rail route to the Morris, Ill. AFR has, as of this writing, gone into receivership with some doubt as to the continued operation of its lines (Jasmer, 1982). Dependence on rail shipment is thus uncertain, regardless of the size and content of the train.

Handling a rail accident also presents unique problems. In addition to the firefighting complications imposed by the diversity and quantities of materials moved on particular freight trains, the following problems must be considered:

— Access by road to the accident site. Rail yards in urban areas do not allow easy access to all areas by emergency equipment. Rural areas are often worse.

— The weight and size of the cask. Lifting a 100-ton cask presents a formidable task if it leaves the proximity of the rails since mobile cranes with this capacity are not numerous or readily available.

— Radio communication between rail and emergency relief personnel is not standardized.

— Rail routing is likely to be less familiar than road routes to emergency relief personnel.

— Rail routes often pass hazardous material storage facilities located near mainline railroad tracks. In past accidents some derailed cars have traveled hundreds of feet and others collided with gasoline

> storage tanks, yet no accounting is made of this kind of accident in probability studies. However, the National Transportation Safety Board recently suggested that rail rights-of-way be reviewed to reduce the chances of a collision between hazardous material containers and derailed trains (NTSB, 1982).

Despite these reservations on rail use, one rail route has recently been approved by the NRC between the Cooper Station reactor in Nebraska and the Morris, Ill., AFR. There have already been two serious derailments of regular freight traffic in the six months since the shipments were announced (Hawk Eye, 1982), and the shipments originally planned to go by special train are now scheduled by regular freight. Local rail unions have begun to speak out in opposition to these shipments and have called for their suspension (see Box 5-12).

Many European countries move irradiated fuel by rail and "the trend in spent fuel transport in Europe is towards heavy rail casks" (AGNS, 1978). The same practice could develop in this country, but a full checklist of safety matters must be seriously addressed by the industry. While most highly developed countries maintain a viable track system, the U.S. has elected to put its resources into the highway system. Improving trackage and the rail infrastructure would be a major reversal in government policy. It is possible but highly unlikely.

Much less information is available for evaluating water transport. The kind of accident analyses available for railroad and highway transport are simply not available. The literature lacks basic design data and detailed engineering drawings of barge shipments of irradiated fuel. The closest representation is a steam generator shipment by barge, from the Surry reactor in Virginia to Hanford, Wash. (see Figure 5-6). The possibility of collision with hazardous material tankers, the likelihood of long fires, the feasibility and economics of intermodal transfer, radio communications, presence of fire fighting equipment, crush and accident environments, and the consequences of an accident all need evaluation. According to one government-sponsored report, "little work has been done on characterizing the normal and accident transportation environment and formulation of design requirements. Little work has been done on radiological consequences of accidents" (AGNS, 1978). Discussion regarding barge accidents is found in Chapter VI.

## History of Cask Certification Tests

Although commercial power reactors first began operation in the early 1960's (Dresden 1 and Yankee Rowe in 1961 and Indian Point 1 and Big Rock Point in 1962), it was not until 1967 that commercial shipments to Nuclear Fuel Services, the first commercial reprocessing venture, began. Cask tests were developed earlier in anticipation of a burgeoning new industry. The certification tests in use today—impact, puncture, fire and immersion—have remained essentially unchanged since that time. But highway and rail conditions have changed dramatically.

The early history of cask certification standards followed two paths. A series of proposed regulations were issued in the United States in the 1950's by the AEC, the U.S. agency responsible for issuing standards for the transport of large quantities of radioactive and fissionable materials. In 1959, the international nuclear community, led by Great Britain, began to develop standards through the International Atomic Energy Agency (IAEA). This led, in 1964, to an agreed set of international standards, which were then promulgated by the AEC in 1965, and adopted in 1967.

The regulations, first proposed by the AEC in September 1957, were not specific testing standards for casks. Rather, they required that a licensee evaluate the "proposed procedures to protect against accidental conditions of criticality, taking into account the possibility of accidents, including flooding, fire and wreckage" (24 FR 7541). Each shipping application was to be decided on a case-by-case basis.

### AEC Tests

The first AEC regulations with general cask performance standards were developed by the Inter-agency Committee on the Transportation of Radioactive Materials, consisting of representatives of the Interstate Commerce Commission, Bureau of Explosives, Federal Aviation Agency, U.S. Coast Guard and the Post Office Department (27 FR 2236). They required that at all times the hottest fuel assembly within the cask be at least 180°F below the fuel melting point, which is higher than 3,000°F, and that the cask withstand a 30-foot drop onto a solid object. No fire or puncture tests were proposed.

The proposed regulations were criticized by nuclear industry representatives, who claimed that "sufficient information was not available on plastic deformation of the various materials used in cask construction and the variation of the various materials used in cask construction and the variation of the impact forces as a function of angle impact on the dynamic loading conditions to design a cask in such a way as to predict with confidence that it would meet the 30-foot drop test." As a result of industry pressure, the 30-foot drop test was changed to a 15-foot free fall onto a large, flat, unyielding surface in such a way that the cask could land either on its end or side (28 FR 8983). When the Commission realized that temperatures greater than 3,000°F would vaporize many of the radionuclides in the cask and that the previous proposed regulation did not adequately protect public health and safety, the temperature requirements were tightened so that the external surface of the cask could not exceed 180°F. In addition to the drop impact test, the Commission added three more: a puncture test in which the cask was dropped onto a six-inch diameter plug, submersion in water, and exposure to what is called a standard one-hour fire. In a standard one-hour fire, the following temperatures are reached after the beginning of the fire: 1,000°F after five minutes; 1,300°F after ten minutes; 1,550°F after thirty minutes; 1,700°F after one hour (NFPA, 1950).

The proposed regulations were revised, proposed again on March 5, 1963, and again came under industry attack. Claims were made that "the detailed standards proposed might impair the growth of the industry and development of improved safety concepts" (30 FR 15749). Revised regulations were then proposed in December 1965 and adopted in 1967. They incorporated the 1964 IAEA regulations.

Rather than "guarding against every conceivable condition which could be encountered in transport," the Commission proposed the four testing conditions on the assumption that a cask designed to withstand them was "considered to give reasonable assurance of satisfactory performance in accidents likely to occur in transportation" (Barker, 1981). What the words "reasonable assurance" and "satisfactory performance" meant is a problem to this day.

## International Cask Tests

The IAEA regulations of 1964, which were adopted by the AEC in 1967, had their origins three years earlier. The IAEA convened panels of experts on the shipment of large radioactive sources in July 1959 and February 1960. Its 1961 edition of the transport regulations provided general guidance but lacked specificity:

> "In the construction and design of the container and shield, the following general factors shall be taken into account in light of the purpose for which the container is to be used and the conditions the package may encounter during such use:

> (a) action of fire, shocks and water; (b) corrosion of the container and its closures by the contents; (c) effects of changes in temperature and pressure; and (d) the need to decontaminate surfaces" (IAEA, 1961).

More specific guidance was issued in accompanying notes. While arguing that insufficient information was available to quantitatively describe the accident environment, the notes nevertheless proposed tests which allegedly met highway and rail conditions that existed in Great Britain. The document is replete with qualitative assertions such as "vehicles on the road travel at any speed up to, say, 60 mph. In the majority of accidents some slowing down takes place in the odd seconds of warning. . ." Presumably these were the speeds on highways in Great Britain in the 1950's. The author describes a cask falling from a bridge or down an embankment, but concludes, without analysis, that glancing blows followed by rolling of the cask mitigates the accident's severity. The author concludes, "weighing up all the above information, it is felt that a direct drop of 30 feet on a hard surface is a reasonable test." This 30-foot test exists to this day.

While stating that temperatures up to 1,850°F might be obtained, noting the increase in the use of trains carrying only inflammable material, and the possibility of the standard fire reacing 1,850°F in the second hour, the author nevertheless concludes that "the test proposed of 1,475°F for half an hour is felt to be as searching as the British standard fire for one hour." No proof was given. The test was to be conducted by placing the cask into a 1,475°F oven for half an hour, causing shock heating at the beginning of the test, whereas the British standard fire begins at room temperature. The IAEA panel rejected the British standard fire of one hour because the conditions in a transport accident would be much different. "A petroleum fire, in a transportation accident, heats up very quickly, burns uniformly and can produce blackening of the package surfaces. Also, in transport, fire fighting equipment may not be readily available in remote areas" (Barker, 1981). No explanation was given as to why this shock heating was more severe. The 1,475°F temperature test as described in 1961 is still in use today.

Regarding torch fires, in which a burning jet is aimed at the cask, the author concluded that "torching can occur to produce high local temperatures, but the overall effect is small." A torching fire standard was considered by the IAEA panel in 1963, but was rejected. Economics were a factor in the consideration. According to a member of the IAEA Cask Standards Panel.

> "a torching flame is so hot that one can't design to protect against it without great effort or cost. The probability of this affecting a container is greatly reduced

> by the limited likelihood of such a flame being produced accidentally in a spot to impinge on a radioactive material container. Hence, it was thought that this type of accident condition, on the balance of judgment, was not of sufficient probability to justify it being considered" (Barker, 1965).

Torch tests, as one of the cask certification requirements, are not required as of this day even though the likelihood of a torch-type fire has been greatly increased by the nature and quantities of chemicals in common commerce today.

No puncture test was suggested by the panel in 1961, but the 30-foot drop test actually employed in Great Britain was onto a one-foot wide steel slab which exerted very high shear forces, greater than 2,000 g. The main discussion at the time among IAEA experts was whether to use the U.S. drop test onto an unyielding surface from a 15-foot height *plus* the puncture test, or solely the 30-foot drop onto a one-foot-wide bar suggested by the British. In the end a compromise was reached. The British 30-foot drop onto an unyielding surface was selected, plus the American puncture test. The U.S. test was considered more reproducible than the British test. The puncture test—a 40-inch drop onto a six-inch diameter spike—was "a practical simulation of a piece of railroad track acting as a penetrator" (Barker, 1981). The bases for the tests actually employed in Great Britain in 1961 were published in 1963 (UKAEA, 1963). This 1963 paper became the basis for the adoption of international standards.

The IAEA Panel on Test Standards met in 1963 and agreed on the broad objectives:

1. The testing requirements were "*to be comparable* with the conditions experienced in the transport environment, but *not* to represent or reproduce every conceivable condition or even any particular condition." The test procedures were to "provide a means of showing, at a reasonable cost, whether a package design would be likely to withstand most accident conditions" (Barker, 1981).
2. Testing requirements were "*to be practical* in that the number of tests be kept to a reasonable minimum and their nature be such, as far as possible, that they might be carried out using readily available facilities and equipment."

These broad objectives were translated into the four cask tests—fire, drop, puncture and water immersion—that are in use today.

## Box 5-9.

### Sandia National Laboratories Crash Tests

In 1977 and 1978, Sandia National Laboratories in Albuquerque, N.M., under contract to the U.S. Department of Energy, made films of crash and fire tests on three irradiated fuel casks. The tests were originally performed to assess the applicability of scale and computer modeling techniques to actual accidents and were useful in impact analysis.

Unfortunately, the films were quickly put into service as "proof" to the public of cask safety. They were given nationwide TV (WNED, 1981) and magazine (Mesdag, 1978) coverage. They were used by many speakers representing the electric utilities. Still photos from the film were made into a brochure used for selling casks (NLI, 1980) and for thwarting efforts to pass local legislation regulating irradiated fuel transportation (NAC, 1979d).

According to one industry study of nuclear transport, the films "did more to help the nuclear shipment safety image than anything else in recent years" (Sandia, 1979). One thousand copies of the film, plus a shortened version, have now been distributed world-wide (Chitwood, 1980). In the debate on the safety of fuel transport, the films have become the mainstay for the nuclear industry.

The basic concept of the film is laudable. The public should be apprised of government efforts to ensure safety in nuclear materials transportation. However, while initially produced as a semi-technical presentation, the original 14-minute film, called "Accident Safe," was shortened to a 4-minute examination of "Five Full Scale Tests." It eliminated most of the qualifying statements contained in the longer version. Although the script of the film was reviewed by DOE officials before the documentary was produced, the film contains numerous misleading concepts and images, and omits significant facts. Specific observations on the film and on the tests themselves that cast doubt on the veracity of the film include the following:

- The casks in the film were not designed to the existing standards. They were "obsolete" (to quote Sandia) and taken out of service in 1967, ten years before the tests (NRC, 1979e). At least one of them was designed to a higher standard than today's casks (Sandia, 1978c).
- The casks did not contain irradiated fuel, which would produce heat and pressure. They held a fresh, clean, cold, unirradiated fuel

assembly from the merchant ship S.S. Savannah. The cladding was stainless steel rather than zircaloy (Sandia, 1978d) which is used in commercial reactor fuel and is more brittle.

- The casks were protected by impact limiters, a form of shock absorber. Most shipments in the past did not have limiters (PNL, 1978) and other casks still in use do not have them. The casks used in the Sandia tests were designed to remain intact without use of impact limiters. The cooling fins, not found on most modern truck casks, also absorbed part of the impact of the train crash.
- The casks were not pressurized sufficiently and therefore the valves were not adequately tested. A pressure of 26 psi (Sandia, 1978c) was used, although some casks may maintain over 130 psi (PNL, 1978) during routine operation, and even higher under accident conditions.
- All the casks had lead shielding, while most of the casks in use today have depleted uranium shielding (AGNS, 1978). One industry study stated that "care must be taken not to portray the results of these cask tests to other generic types of casks, such as those with depleted uranium shielding" (NAC, 1977). Lead behaves differently from uranium under impact, puncture and fire.
- The film shows a technician checking for radiation before and after a test and the truck is labeled with warning signs reading "RADIOACTIVE" in large letters. No clarification is made that the *fresh* fuel used in the test was only one-millionth as radioactive as irradiated fuel, that it had no contaminants on its surface (as is usual with irradiated fuel) or that there was little likelihood of detecting much radiation from the fresh fuel even if the cask had been breached, unless the geiger counter was directly over the crack.
- The film's soundtrack states after each test that no radiation would have been released, but two of the tests actually resulted in leakage of water from the cask! In one case about 100 cc (about half a cup) was released (Sandia, 1978d). Had the cladding been damaged, the fluid would have been seriously contaminated (as happened in a 1980 shipment) (NRC, 1980d), the internal pressure would have been higher (as previously detailed), and the pathway that allowed the 100 cc release would probably have released a much greater volume of fluid in the form of steam. Such an event could have had serious health consequences, especially to emergency personnel near the cask.
- The film emphasizes that the cask in the fire test showed no damage during a 90-minute period, but fails to mention that ten minutes later the outer shell cracked open in two places, the shielding began to vaporize, and the test was stopped as a result. No mention

is made that the cracking was due to faulty manufacture and welding (Sandia, 1980c).

- In the truck crash tests, the casks hit the wall only after striking the rear of the truck cab, which reduced the shock to the cask. Concluding that this indicates the casks can withstand impacts at the velocity of the truck is "dangerous," according to one NRC official. "It was the truck that had the impact," (News, 1978). The cask itself hit the wall at only 29 m.p.h., not at 62 m.p.h.
- The film also shows several drop tests of casks, both with and without impact limiters. In the second drop of a cask without a limiter, a crack formed along a weld leading directly to the cask's inner cavity, creating a pathway for leakage, had there been irradiated fuel in the cask (ORNL, 1978). This particular drop was shown in the film but no mention was made of the failure. While such multiple drops are not part of the regulatory requirement, they could occur if a cask were to bounce on pavement. In the film of the train-truck crash, the cask bounced *twice* (ERDA, 1977).
- In the first test, the cask was held in a special steel harness that acted as a "shield between the cask and the heat source" (Sandia, 1980b) which can "significantly affect the amount of heat input" (Sandia, 1980b) to the cask. This fact, like the others in this list, was not mentioned in the film. The Sandia train cask was designed to withstand a one-hour fire rather than a one-half hour fire, which is the standard for today's casks (Yoshimura, 1978).
- The tie-downs holding the truck cask to the trailer were of superior design, much stronger than the chains that are commonly used. The contrast in tie-downs between the test and an actual shipment can be seen in Figures 5-1 and 5-2, respectively. As a result, the trailer absorbed most of the collision impact. Had chains been employed, the cask would have broken loose from the trailer and hit the wall at high speed.

These full-scale tests have created some controversy for other reasons as well. When first proposed, the tests caused concern in the nuclear transport community because "the son-of-a-bitch might break," yielding bad publicity (Sandia, 1979). Other transport experts have been critical of the film because an unsophisticated audience could interpret what it saw as "evidence" of cask safety. A specialist with the National Transportation Safety Board stated:

> "It is the misuse of these films to represent that the casks are safe that is objectionable. . . . The high speed collision tests represent only two of a larger number (of) accident scenarios that need to be analyzed to assess the safety of spent fuel cask transportation." (NTSB, 1979c).

The film places all the attention on the cask as the main line of defense against radiation leakage. It also makes the tacit assumption that the cask will be manufactured and maintained perfectly, although the NTSB official stated that "the Safety Board's accident experience suggests that this is not a valid assumption." An independent evaluation of the tests was also offered by a consulting firm hired by the NRC to develop an overview of irradiated fuel cask accidents. That group described the tests as "interesting, but inapplicable for irradiated zircaloy" (NRC, 1979f). Almost all commercial irradiated fuel in use today is clad with zircaloy.

## CHAPTER V

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**Mr. Florio.** We have a vote on the full committee that I am required to attend on reconciliation with medicare, and if there is no further business, the committee will stand adjourned at this point.

[Whereupon, at 2 p.m., the subcommittee was adjourned.]

[The following statements and letters were submitted for the record:]

Sub-committee on Commerce, Transportation and Tourism -
Hon. James Florio, Chairman
Sub-Committee Hearing on Safe Transport of Nuclear Waste

## TESTIMONY OF ASSEMBLYMAN ELIOT L. ENGEL OF NEW YORK
## The responsibility for transporting radioactive materials - "Whose backyard is this anyways?"

I am Assemblyman Eliot L. Engel, Chairman of the Assembly Office of State-Federal Relations. I represent the Northeast part of Bronx County, a district that is traversed by each and every shipment of irradiated fuel that has left Brookhaven National Laboratories on Long Island since the federal pre-emption was handed down.

I wish to thank Congressman Florio and the members of this Sub-committee for taking the time to hold a hearing that, I believe, will help to shape the future of transporting such dangerous materials as high level radioactive wastes, and for allowing me the opportunity to present testimony. The recognition of this matter by this Congressional Sub-committee is an act of responsibility in government, and one that the public will find to be a reassurance that elected officials do care.

One of the reasons that I believe that hearings such as these are so important is due in large part to the fact that this issue has become a silent threat. Many people, with many different roles, from an entire spectrum of viewpoints, have worked diligently to bring this issue to the forefront. Yet, it has not received the attention that it needs to become an issue of the day. The potential for disaster that these shipments carry if left without guidance warrants at least that much.

A short while ago, I received a letter from a Grandmother in my district, which included an essay that her 13 year-old grandson, Christopher Brennan, who also resides in my district, had written for school. It was entitled "The Government Never Listens", and is as follows:

> It has been planned by the New York State Government, without any input from the people, that fifteen trucks carrying nuclear waste will pass through the borough of the Bronx over a twelve month span.
>
> It is rather useless to state the destruction that nuclear waste is capable of performing, for the subject is rather exhausted. But, a subject that is not exhausted is based on the fact that the people no longer have a say in political issues that affect their lives.
>
> If an accident should occur in the Bronx due to the passage of nuclear waste, it will not be the lives of those government officials who made the decision that will be destroyed, but rather the lives of those residing in the Bronx who had no say in the decision.
>
> Strangely enough, no trucks containing nuclear waste have passed through Albany lately. However, a fair amount of trucks containing nuclear waste have either passed through or near the New York Metropolitan area.

> The government officials who made the decision concerning the passage of nuclear waste through the Bronx in particular and all government officials in general, should first receive the consent of those whose lives will be most affected before making a decision. This may mean that they will not receive a raise in pay or a promotion, but they will be satisfying the people. Isn't that their job?

I find the writings of this 13 year-old, the astute observations that he makes on an issue that he obviously finds to be a source of fear, to be very disconcerting. If a young man, who expresses himself so well, is frightened by something that he feels is beyond his control, believing that this grave issue is far down on the government's list of priorities, is it not time that we take action, resolve the issue, and allay the fears of the people now watching these trucks roll past their homes?

The major question that is raised is that of responsibility. Who should play what role in regard to transporting these highly radioactive materials?

Through my involvement in this issue, one that has spanned two to three years, addressing the issue as a legislator, as an affected individual who resides along "Blood Alley", which is one of the most treacherous stretches of highway in the state and also a part of the shipping route, as a community leader and as Chairman of the Assembly Office of State-Federal Relations, I have found that no single body or office can be fully responsible for the control and direction of the shipment of high level radioactive materials. Each part of the governmental structure has an important, if not clear cut, role to uphold.

In this testimony, I intend to address this question as I perceive it. I hope to convey my viewpoint such that it will give insight into how the issue should be attended to, from the perspective of a state legislator actively involved in the issue, reviewing the various levels of government involved.

I. The role of the federal government is something that must be looked upon as that body which must take the reins, and become the driving force behind a resolution. In light of the ramifications of interstate commerce, interstate transportation, and federal control over regulation of radioactive materials, the crux of this issue is found at the federal level. This is not singular participation by Congress or the Executive Office, but each must attend to different aspects of the nuclear trucking issue.

A. Congress must create specific guidelines beyond those presently in place. The public, the states and the White House need more concrete direction as to the transporting, handling and route-controlling of these materials. Congress should delineate criteria for transport, and specifics for route requirements. Congress must also resolve the issue of defining what constitutes a route. The issue of water-borne transport is one that can only be dealt with on a federal level.

B. The Executive Branch should be more responsive, with increased accountability, when addressing this issue. As the U.S. Departments of Transportation and Energy play "ping-pong" over responsibility for various aspects of this process, the public suffers the hardship of a potential for great danger. Control over the subject in question should be centralized within one Federal Department.

II. The status of individual states, especially New York, and the function that we are to perform, is diffuse and not well defined. While certain tasks and responsibilities, including the creation of routing agencies and development of emergency preparedness programs are under the domain of the states, very little impetus for promulgation of these facets has been provided.

A. The state legislature, I believe, has the authority to provide for route-controlling and emergency preparedness. In actuality, the states may reserve even greater powers in regard to protecting its citizenry. Should this become a battle over State's Rights, which the failure to address this pressing matter would inevitably lead to, the solution to this matter may be lost in the discrepancies created by trying to find it. The question of states protecting our citizens has been raised in the courts before.

> The Tenth Amendment to the Constitution of the United States, in addressing the issue of state sovereignty, has been defined by the courts to include that "The power of states to make regulations to preserve peace of community has never been surrendered." New York ex rel. Cutler v. Dibble (1859) 62 U.S. 366 16 1 Ed 149.

Further:

> Under the Tenth Amendment, Congress may not exercise power in fashion that impairs states' integrity or their ability to function effectively in the federal system. Fry v. United States (1975) 421 U.S. 542 44 L Ed 2d 363 95 S Ct 1792.
>
> The Tenth Amendment may prevent Congress from selecting methods of regulation which are drastic invasions of state sovereignty where less intrusive approaches are available to federal authorities. District of Columbia v. Train (1975) 172 App DC 311 521 F2d 971, vacated 431 U.S. 99, 52 L Ed 2d 166, 97 S Ct 1635, on remand 186 App DC 98, 567 F2d 1091.

I am wary of the possibility of Christopher Brennan's aforementioned fears becoming a reality. The people of the State of New York will do everything within their power to prevent such a frightful occurrence.

The New York State Legislature has proposals concerning the transport of these materials pending and under review. Yet, because of the preemption thrust upon the City of New York, and uncertainty as to the separation of responsibility, we are grappling with the issue of how to proceed. It becomes that much more important for the federal government to intercede and resolve the discrepancies.

B. In New York, the Governor's Office has the power to establish some of the more important segments of route-controlling and emergency preparedness. The Governor stands firm in his belief that Executive fiat is only a temporary solution, and does not resolve the issue. He has directed the New York State Department of Transportation, the State Emergency Management Office the State Police and the Department of Health to oversee the shipments from Brookhaven. But, admittedly, that is only a stopgap measure. Many state legislators have urged the establishment of a routing agency, and will continue to do so. It is an integral part of controlling the transport of radioactive materials within our borders.

Although New York State, with a more clearly defined mandate, can fully address the problems emanating from the shipments as they travel within the borders of the state, it is the external ambiguities that threaten any chance of there being a forthcoming harmonious resolution.

III. As you are well aware, there is a dispute of major proportions presently in existence between the states of New York and Connecticut as to the transport of the shipments from Brookhaven. The government of the state of Connecticut refuses to accept the shipments over water-borne routes, which would alleviate the use of highways through some of the most densely populated areas of the country.

It has become a political issue in Connecticut. That state believes it can not voluntarily agree to take the shipments. No elected official wants to go home to the electorate and explain why he asked to have high level radioactive materials driven through his backyard.

For the State of New York to put additional pressure on Connecticut would serve only to turn the problem into a political football. That is not the goal, nor would it serve any purpose toward achieving the goal. The solution here lies with the federal government. Guidelines coming from Washington that are fair and feasible would serve to resolve an impending border squabble.

But, the transportation of dangerous high level radioactive materials is a statewide problem in New York. Shipments coming into New York from the Chalk River power plant in Canada, control rods from the Yankee-Vermont plant, and the development of further power plants within the state all must be addressed under these same provisions. This will require the expenditure of time and vast sums of money, following promulgation of guidelines that grant an expanded approach to the state.

It is unfortunate that neighboring states are forced to restrict their borders, leading to embitterment concerning such an issue. Further, the expenditure of great sums of money for individual studies and counter-studies like those from Arthur D. Little and Connecticut should have been prevented by earlier action by the federal government.

The Little study, which determined risk of hazard over the various routes and alternatives, cost $75,000 to prepare. The study is thorough, and appears to be quite accurate.

IV. In addition to the methodology of the Little study, my office has been actively researching the effects of the "Rebuilding New York" infrastructure renewal program, deemed by the N.Y.S. Department of Transportation as having "more transportation work in progress today than at any other time in our state's history," (D.O.T. Commissioner James LaRocca - July 3, 1985).

Attached to this testimony, you will find a map and a list of construction projects, directly affecting the route of shipping from Brookhaven to the southern border of Westchester County. The map reproduces the route, and has present and upcoming highway construction delineated upon it. Clearly demonstrated is that by May, 1986, 90% of the prescribed route will have lane obstructions due to renovation at one time or another.

While awaiting further information on accident comparisons due to lane obstructions caused by construction, it is worth noting that this may pose an additional risk. When the N.Y.S. Department of Transportation supplies the information that I have requested concerning accident rates over specific areas before and during construction, I will forward these to the Sub-committee.

V. Conclusion

I fully believe that the case has been made for expeditious action to regulate the transportation of radioactive materials, allowing for safe transport over the best routes possible, with the greatest degree of safety and emergency preparedness.

To enact this, Congress must take positive steps now. Strict guidelines must be established, determining what materials can be shipped in what amounts, with specified route criterion including highway, rail, and water-borne methods.

The federal government must centralize its overseeing of the transportation process, as there is no need for the NRC, the DOE and the DOT all to play an individual part in regulating these shipments.

Fair and equitable guidelines will serve to eliminate border problems like those being experienced by Connecticut and New York. The root of this problem is not so much a lack of cooperation as it is a lack of affirmative definition. These guidelines must include stringent rules and regulations over the transporters, the vehicles used for the transportation of high level radioactive materials, and other specifics that will protect the public and the transporter. The route requirements must be clearly defined, including permissible roadways, road conditions, traffic pattern considerations, and a final solution to the question of waterborne and other alternate forms of transport.

In this same vein, federal control may serve to re-route some of these shipments. It is unclear as to why these shipments must go to South Carolina via Idaho, while the shipments of similar materials from Chalk River in Canada must cut through New York State and go south, rather than travel along the north side of the Canadian border to Idaho. This is a federal question, out of the hands of the government of the state of New York.

Upon completion of the federal government's guideline reform, the states will be able to generate controls and programs of their own. Routing agencies, emergency preparedness and safety programs will come much more easily under uniform guidelines.

However, cost will become a major factor. Creating and administering a routing agency will require an initial infusion of great sums. Emergency preparedness and safety programs will need additional funding, not only for the high population areas, but also for the remote, rural segments of the route that work with limited funds and volunteer memberships.

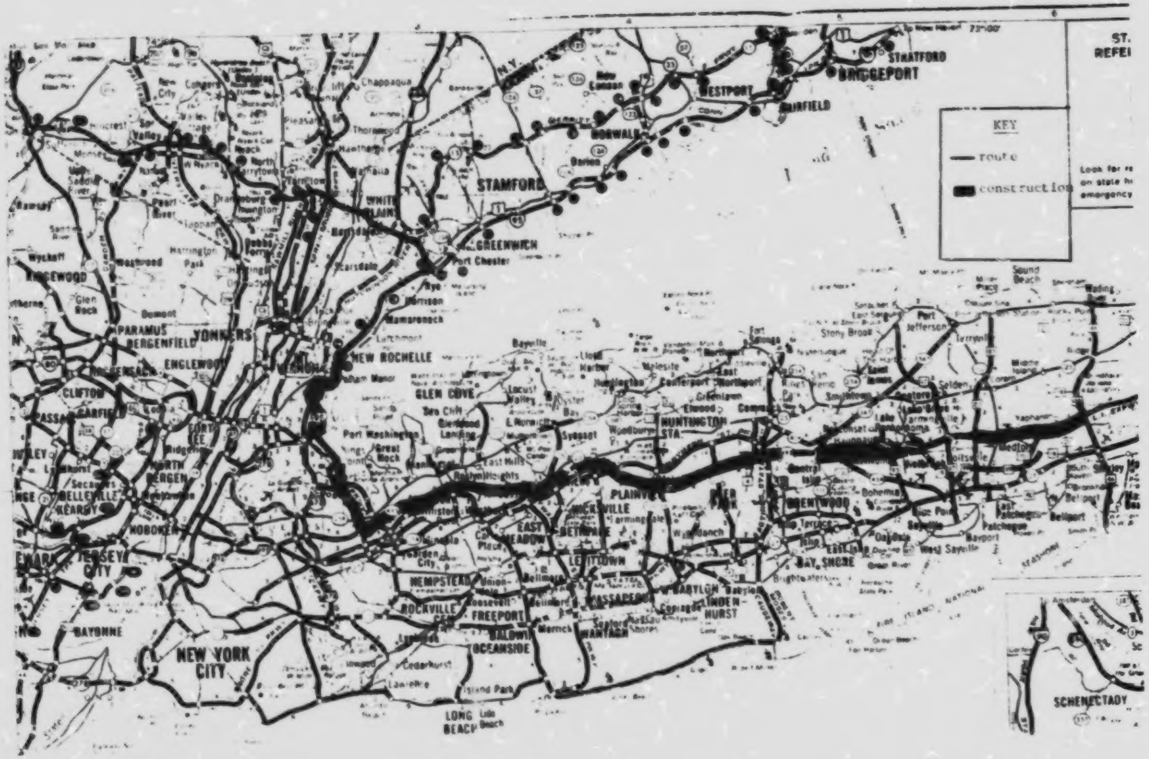
The most feasible manner of gaining revenue would be the levy of fees for use and fines for improprieties upon the industry itself. Producers should be charged a per shipment fee, and a licensing fee for the generation of wastes that will have to be transported. Transporters should pay a per vehicle fee, and other transportation and driver licensing and quality control costs. The recipients of these shipments can present financial assistance for the costs that they create. Although this could not, in my estimation, raise all the funds necessary, the burden placed upon the public treasury, created by the cost of protecting ourselves, could be greatly diminished.

The funding mechanism could be either state oriented, or a federal fund similiar to "Superfund".

Uniformity of regulation, on a regional or state-by-state basis, could go a long way towards eliminating many of the problems that have hampered progress on the issue thus far.

In this past session of the New York State Legislature, I, along with co-sponsors from around the state, introduced legislation, based on the Pennsylvania law of 1984, that addressed all of these issues and specifics (attached). It is a workable model; one that lays the groundwork for safe and rational control. In all honesty, what it lacks is substantial guidelines on the federal level. The most stringent guidelines are limited in effectiveness if the bordering states along the route do not adhere to similar directives.

I thank you for the opportunity to present my views and testimony, and I urge this Sub-committee to take action that will allow people like Christopher Brennan to grow up healthy, with a future as bright as ours was when we were his age.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Thornwood
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Valhalla
Elmsford
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Dobbs Ferry
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Centereach
Farmingville
Medford
Patchogue
East Patchogue
Bellport
Bayport
Blue Point
Holtsville
Yaphank
Middle Island
Sound Beach
Miller Place
Shoreham
Wading River
Rocky Point
Station
FIRE ISLAND NATIONAL SEASHORE
SCHENECTADY
Amsterdam

## PROJECTS UNDER CONSTRUCTION
## AND SCHEDULED FOR LETTING BY 4/1/86

| ROUTE COUNTY | ---BROOKHAVEN ROUTE--- LOCATION | WORK TYPE | SCHED. LETTING | SCHED. COMPL. |
|---|---|---|---|---|
| L.I.E.<br>Suffolk | Exit 61 to Exit 63 | New Service Roads | 2/85 | 12/85 |
| L.I.E.<br>Suffolk | Exit 61 to Exit 68 | Bridge Deck Repairs | 1/85 | 6/86 |
| L.I.E.<br>Nassau &<br>Suffolk | Exit 44 to Exit 52 | Resurface & panel replace | 3/85 | 10/86 |
| L.I.E.<br>Nassau | Exit 40 to Exit 44 | Resurface & panel replace | 4/85 | 11/86 |
| L.I.E.<br>Nassau | Exit 40 to Exit 41 | New WB Service road | 4/85 | 11/86 |
| L.I.E.<br>Suffolk | Exit 57 to Exit 58 | New EB Service Road | 6/85 | 11/86 |
| L.I.E.<br>Suffolk | Exit 57 to Exit 58 | New WB Service road | 10/85 | 11/86 |
| L.I.E.<br>Nassau | NYC Line to Exit 39 | Joint Sealing | 10/85 | 9/86 |
| L.I.E.<br>Nassau &<br>Suffolk | NYC Line to Riverhead | Sign replace | 11/85 | 11/86 |
| L.I.E.<br>Suffolk | Exit 52 to Exit 57 | Resurface & panel replace | 11/85 | 12/87 |
| L.I.E.<br>Queens | E. Hampton & Bell Blvd. over L.I.E. | Bridge rehab. | 12/85 | 2/87 |
| L.I.E. &<br>I295<br>Queens | Ramp from L.I.E. WB to I295 SB | Bridge rehab. | 11/85 | 12/86 |
| I295<br>Queens | Hillside Avenue to Throgs Neck Bridge | Median repair | 11/85 | 4/87 |
| I95<br>Bronx &<br>Westchester | Bartow Avenue to Connor St. | Reconst. & Bridge Rehab. | 12/84 | 10/85 |
| I95<br>Bronx &<br>Westchester | Eastchester Crk. to Rte. 1 | Reconst. & Bridge Rehab. | 12/84 | 11/86 |

---End of Brookhaven Route mapped---

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---YANKEE-VERMONT ROUTE---

| ROUTE<br>COUNTY | LOCATION | WORK TYPE | SCHED. LETTING | SCHED. COMPL. |
|---|---|---|---|---|
| I84<br>Putnam | Bridges over Tonetta Lake Road | Bridge Deck repairs | 10/84 | 9/86 |
| I84<br>Orange | Rte. 9W to Newburgh Beacon Bridge | Widen to 6 lanes | 12/84 | 11/86 |
| I84<br>Dutchess & Putnam | Taconic St. Pkwy. to Conn. St. Ln. | 6 Bridge Deck repairs | 2/86 | 12/86 |
| I84<br>Putnam | Dutchess Co. Ln. to Conn. St. Ln. | Sign replace | 8/85 | 5/86 |
| I84<br>Dutchess & Putnam | Taconic St. Pkwy. to Ludingtonville Rd. | 6 Bridge Deck repairs | 3/84 | 9/85 |

---End Yankee-Vermont Route---

---CHALK RIVER CANADA ROUTE---

| ROUTE<br>COUNTY | LOCATION | WORK TYPE | SCHED. LETTING | SCHED. COMPL. |
|---|---|---|---|---|
| I81<br>Jefferson | Canadian Border to Oswego Co. Ln. | Resigning | 11/85 | 11/86 |
| I81<br>Onondaga | Bear Road Overpass to 0.3 mi. South of 7th N. St. | Reconst. & Bridge Construct. | 6/82 | 9/86 |
| I81<br>Onondaga | 0.3 mi. South of 7th N. St. to 0.5 mi. South of Rte. 11 | Reconst. & Widen | 3/83 | 9/86 |
| I81<br>Onondaga | 0.5 mi. South of Rte. 11 to Airport Blvd. | Reconst. & Widen " | 9/83 | 12/86 |
| I81<br>Onondaga & Cortland | Rte. 80 to Rtes. 41 & 11 | Reconst. | 10/84 | 10/86 |
| I81<br>Onondaga | I690 to Brighton Avenue | 9 Bridge Deck repairs | 1/86 | 10/87 |
| I81<br>Cortland | Rtes. 41 & 11 to Broome Co. Ln. | Resurface | 11/85 | 7/87 |
| I81<br>Broome | Windy Hill Rd. to Five Mile Pt. | Resurface & Bridge replace | 10/84 | 10/86 |
| I81<br>Broome | Castle Crk. to Whitney Pt. | Resurface | Fall '85 | Fall '86 |
| I81<br>Broome | Exit 6 | Bridge Deck repairs | 12/85 | 12/86 |
| I481<br>Onondaga | Northern Blvd. to I81 | New Hwy. Const. | 3/83 | 9/85 |

---End Chalk River Canada Route---

# STATE OF NEW YORK

S. 4697 A. 6562

1985-1986 Regular Sessions

# SENATE–ASSEMBLY

March 26, 1985

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IN SENATE -- Introduced by Sens. CALANDRA, STAVISKY -- read twice and ordered printed, and when printed to be committed to the Committee on Transportation

IN ASSEMBLY -- Introduced by M. of A. ENGEL, McPHILLIPS, HEVESI, MAYERSOHN, TOCCI, SERRANO, SEMINERIO -- Multi-Sponsored by -- M. of A. BRAGMAN, BRODSKY, CATAPANO, COLMAN, CONNOR, DEARIE, DUGAN, GOTTFRIED, GREENE, HARENBERG, JACOBS, JENKINS, KOPPELL, LAFAYETTE, LIPSCHUTZ, MURTAUGH, NEWBURGER, PILLITTERE, PORDUM, RIVERA, SEABROOK, SIEGEL, SILVER -- read once and referred to the Committee on Environmental Conservation

AN ACT to amend the transportation law, in relation to routing and transportation of radioactive material

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. The transportation law is amended by adding a new article eighteen to read as follows:

ARTICLE 18

RADIATION TRANSPORTATION PROTECTION ACT

Title 1. General provisions.
2. Federal-state agreements.
3. Radiation transportation protection.
4. Fees.
5. Radiation emergency response program.
6. Transportation of spent nuclear fuel.

TITLE 1

GENERAL PROVISIONS

Section 501. Short title.

EXPLANATION--Matter in italics (underscored) is new; matter in brackets [ ] is old law to be omitted.

LBD08939-02-5

501-a. Legislative findings.
501-b. Definitions.

§ 501. Short title. This article shall be known and may be cited as the radiation transportation protection act.

§ 501-a. Legislative findings. The legislature hereby determines, declares and finds that, since radiation exposure has the potential for causing undesirable health effects, the citizens of the state should be protected from unnecessary and harmful exposure resulting from transportation of radioactive materials, radiation sources, accidents involving nuclear power and radioactive material transportation. It is the purpose of this article to:

(1) Establish and maintain a comprehensive program of transportation radiation protection in the department of transportation.

(2) Provide for the licensing and regulation in cooperation with the federal government, other state agencies and appropriate private entities of transportation of radiologic equipment and procedures therefor.

(3) Maintain a comprehensive environmental radiation monitoring program at route locations throughout the state.

(4) Establish a nuclear safety transportation program to make analyses of routing for the transport of route-controlled radioactive materials in the state. Such analyses restricted to the specific use of the commissioner and his designees authorized by law for the purpose of informing the governor, the legislature and concerned and affected federal, state and local government organizations. It is not the intent of this article to duplicate or conflict with any aspect of the exclusive federal regulatory authority applicable to nuclear power plants and licensed plant operators but rather to provide the state with requisite, qualified professional nuclear expertise to maintain competent and continuing analyses of routing for the transport of route-controlled radioactive materials throughout this state and to exclusively employ that expertise for the appropriate and authorized needs of the state when such activities may have a significant potential for consequences beyond the site of a nuclear power plant. Accordingly, except as expressly and directly stated, none of the provisions of this article are applicable to nuclear power plants and licensed plant operators.

(5) Maintain a technical emergency radiation response capability within the department, to respond to accidents throughout the state.

(6) Assume licensing and regulatory responsibility for routing of radioactive materials from the federal government. This article shall not authorize the department to license or operate low-level radioactive waste disposal sites.

(7) Carry out comprehensive remedial action programs.

(8) Establish in the department a comprehensive radiation emergency response program supported by fees from the nuclear industry.

(9) Establish a radiation transportation emergency response plan and procedures for notification of spent nuclear fuel shipments, New York state police escort; and

(10) Establish fees.

§ 501-b. Definitions. The following words and phrases when used in this article shall have the meanings given to them in this section unless the context clearly indicates otherwise:

(1) "Abatement." Any action deemed necessary by the department to protect public health, safety or welfare, or public or private property, resulting from the transport of a radiation source.

(2) "Electronic product radiation." Any radiation emitted by products subject to the Radiation Control for Health and Safety Act of 1968 (Public Law 90-602, 82 Stat. 1173).

(3) "NRC." The United States Nuclear Regulatory Commission or any predecessor or successor thereto.

(4) "Person." An individual, corporation, firm, association, public utility, trust, estate, public or private institution, group, agency, political subdivision of the state, any other state or political subdivision or agency thereof and any legal successor, representative, agent or agency of the foregoing, other than the United States Nuclear Regulatory Commission or any successor thereto. In any provision of this article prescribing a fine, imprisonment or penalty, or any combination of the foregoing, the term "person" shall include the officers and directors of any corporation or other legal entity having officers and directors.

(5) "NYSP." The New York state police.

(6) "Radiation." Any ionizing radiation or electronic product radiation.

(7) "Radiation source." An apparatus or material, other than a nuclear power reactor and nuclear fuel located on a plant site, emitting or capable of emitting radiation.

(8) "Radiation source user." A person who owns or is responsible for a radiation source.

(9) "Spent nuclear fuel." Fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.

## TITLE 2
## FEDERAL-STATE AGREEMENTS

Section 502. Federal - state agreements.

§ 502. Federal-state agreements. The governor, on behalf of this state, is authorized to enter into agreements with federal agencies for discontinuance of certain of the federal government's activities with respect to radiation protection and the assumption thereof by the state.

## TITLE 3
## RADIATION TRANSPORTATION PROTECTION

Section 503. Powers and duties of the department under this article.
503-a. Review of fee structure.
503-b. Licensing and registration.
503-c. Records.
503-d. Inspection.
503-e. Prohibited uses and acts.
503-f. Penalties.
503-g. Enforcement and abatement.
503-h. Liberal construction.

§ 503. Powers and duties of the department under this article. (a) Regulation in general. The department is hereby designated as the agency of the state for the purpose of registration and licensing of radiation source users who or which transport radiation sources and for regulation and control of such radiation and radiation sources while in transport but, notwithstanding anything in this article to the contrary, shall not have the power to license or regulate telecommunications equipment in duplication of any activity regulated by the federal government.

(b) Employees. In accordance with the law of this state, the department shall employ, compensate and prescribe the powers and duties of such individuals as may be necessary to carry out the provisions of this article.

(c) Powers and duties. The department shall have the power and its duties with respect to this article shall be to:

(1) Develop and conduct programs for evaluation of hazards associated with the transportation of radiation sources and with radiation source users responsible therefor.

(2) Develop and conduct comprehensive programs for the registration, licensing, control, management, regulation and inspection of radiation sources in transport and radiation source users responsible therefor.

(3) Prevent and remedy hazards associated with the misuse of any device emitting electronic product radiation in transport.

(4) Issue such orders or modifications thereof as may be necessary in conjunction with proceedings under this article.

(5) Carry out a comprehensive program of monitoring levels of radioactivity on or near the route or routes used or authorized to be used for transport of radiation sources including all appropriate tests for alpha, beta and gamma levels in all appropriate media. Such sites to be monitored shall include, but not be limited to, those with a substantial potential for environmental radioactivity contamination, and other locations near the route which are recommended by other agencies of the state.

(6) Develop, prepare and submit to the senate and assembly transportation committees within two years of the effective date of this article a plan to provide the department with independent monitoring capabilities on or near all routes in the state in order to identify events requiring remedial action to protect the public from radiation exposure.

(7) Prepare a technical emergency radiation response plan and provide the capability for responding to emergencies on or near each route throughout the state.

(8) Make available technical staff and equipment to determine levels of radiation in the environment and identify emergency measures to protect the public from exposure to such radiation in the event of a radiation accident or a transportation accident involving radioactive materials or any other condition or occurrence which necessitates radiation emergency assistance on or near a route in the state.

(9) Advise the governor, the legislature and the general public with regard to nuclear transport safety, nuclear emergencies, radioactive waste transport management, route monitoring results and other radiation transport control activities and consult and cooperate with the various departments, agencies and political subdivisions of the state, the federal government, other states, interstate agencies, political subdivisions and with groups and individuals, including members of the public, concerned with radiation transport safety and participate in matters before the NRC or its successor and other appropriate agencies and courts of the United States.

(10) Accept and administer loans, grants or other funds or gifts, conditional or otherwise, in furtherance of its functions, from any source, public or private, including the federal government.

(11) Encourage, participate in or conduct studies, investigations, training, research, remedial actions and demonstrations relating to control, regulation and monitoring of transportation of radiation sources.

(12) Collect and disseminate information related to the control of transportation of radiation sources, radiation protection, emergency response and the effects of radiation exposure.

(13) Establish special advisory committees as may be necessary to assist the department in drafting rules and regulations and to advise the department regarding implementation of specific portions of the regulations or specific programs of the department. Each committee shall include members of the general public. Members of these committees may be reimbursed by the department for reasonable and necessary expenses incurred in connection with their duties as approved by the commissioner within the limits of any appropriation therefor.

(14) Issue registrations and licenses and specify the terms and conditions thereof. This is not intended to require registration and licenses of facilities and activities within the exclusive jurisdiction of the NRC.

(15) Require the payment of and collect fees established under title four of this article.

(16) Issue orders and institute proceedings in courts against any person or municipality to compel compliance with this article, any rule or regulation, any order of the department or the terms and conditions of any registration or license.

(17) Institute prosecutions against any person or municipality for violation of this article.

(18) Assess civil penalties pursuant to section five hundred three-f of this title.

(19) Prepare a report on route and nearby environmental radiation levels, as determined by the monitoring program, on at least an annual basis. Copies of the report shall be submitted to the president pro tempore of the senate and the speaker of the assembly and shall be made available to the general public. The report shall also contain a description and analysis of any emergency responses or other actions taken by the department under this article and any other information about route or nearby environmental radiation or radiation emergencies which the department deems to be of sufficient importance to call to the attention of the legislature and the citizens of the state.

(20) Do any and all other acts not inconsistent with any provision of this article which it may deem necessary or proper for the effective enforcement of this article.

(d) Notification. Whenever the department, in the course of its powers and duties as set forth in this title, determines that levels of radiation exceed the normal range of radioactivity in a given area, the department shall immediately notify the governor, the legislature and the NRC and shall also report its findings to the public and it shall subsequently submit a detailed report on the occurrence to the governor, the legislature and the NRC and shall make such report public.

§ 503-a. Review of fee structure. The department shall review at least every four years the fee structure as authorized by title four of this article.

§ 503-b. Licensing and registration. (a) Authority. The department is authorized to license radiation source users responsible for transport of radiation sources and to require registration of any radiation sources so transported including the times of arrival, departure and transport within the state and the routes to be used and actually used.

(b) Exemption. The department shall be exempt from the licensing and registration requirements of this article and is authorized to exempt certain radiation sources and users from this article provided the department properly determines that such action will constitute an insignificant risk to the health and safety of the public and to persons exposed to radiation sources.

(c) Approval of transfer. No license issued under this article and no right to transport or possess radiation sources granted by any license shall be assigned, or in any manner disposed of, without the approval of the department.

(d) Terms and conditions of licenses. The terms and conditions of all licenses issued under this article shall be subject to amendment, revision or modification by rules, regulations or orders issued by the department pursuant to this article.

(e) Recognition of other licenses. Rules and regulations promulgated under this article may provide for recognition of other state or federal licenses.

§ 503-c. Records. (a) Each person who transports or possesses any radiation source shall maintain records relating to its receipt, storage, transfer or disposal, and such other records as the department may require, subject to any authorized exemptions provided by rules or regulations.

(b) Personnel radiation exposure records. Each person who transports or possesses a radiation source shall maintain appropriate records of personnel radiation exposure, as mandated by the rules and regulations of the department. Copies of these records and those required to be kept shall be submitted to the department on written request. Any person transporting or possessing a radiation source shall furnish upon a reasonable request to each employee for whom personnel monitoring is required or to the employee's representative, a copy of the employee's personal exposure record as the department, by rule or regulation, may prescribe.

§ 503-d. Inspection. (a) Authority. The department or its duly authorized representatives shall have the power to enter at all reasonable times with sufficient probable cause upon any public or private property, building, premise or place, for the purposes of determining compliance with this article, any license conditions or any rules, regulations or orders issued under this article. In the conduct of an investigation, the department or its duly authorized representatives shall have the authority to conduct tests, inspections or examinations of any radiation source, or of any book, record, document or other physical evidence related to the transportation or possession of a radiation source.

(b) Search warrant. An agent or employee of the department may apply to a court of competent jurisdiction, for a search warrant, for the purposes of testing, inspecting or examining any radiation source or any public or private property, building, premise, place, book, record or other physical evidence related to the transportation or possession of the radiation source. A warrant shall be issued only upon probable cause. It shall be sufficient probable cause to show any of the following:

(1) The test, inspection or examination is pursuant to a general administrative plan to determine compliance with this article.

(2) The agent or employee has reason to believe that a violation of this article has occurred or may occur.

(3) The agent or employee has been refused access to the radiation source, property, building, premise, place, book, record, document or other physical evidence related to the transportation or possession of

the radiation source or has been prevented from conducting tests, inspections or examinations.

§ 503-e. Prohibited uses and acts. It shall be unlawful for any person to transport, transfer, bury, receive, acquire, own, possess or dispose of any radiation source in violation of this article. It shall be unlawful for any person to transport an unregistered radiation source or to transport a radiation source without a license to do so where a license or registration is required by the department by rule or regulation.

§ 503-f. Penalties. (a) Offense. Any person, other than a municipal official exercising his official duties, who violates any provisions of this article or any rules or regulations or order promulgated or issued hereunder commits an offense and shall, upon conviction, be sentenced to pay a fine not less than one hundred dollars and not more than one thousand dollars for each separate offense or shall be imprisoned for a term of not more than thirty days or both. All penalty proceedings under this article may be brought in the county where the offense was committed.

(b) Misdemeanor. Any person, other than a municipal official exercising his official duties, who violates any provision of this article or any rule or regulation or order promulgated or issued hereunder, within two years after having been convicted of any offense under this article, commits a misdemeanor and shall, upon conviction, be sentenced to pay a fine of not less than one thousand dollars but not more than twenty-five thousand dollars for each separate offense or imprisonment for a period of not more than one year, or both.

(c) Felony. Any person who intentionally, knowingly or recklessly violates any provision of this article, or any rule or regulation or order of the department or any term or condition of any permit, and whose acts or omissions cause or create the possibility of a public nuisance or bodily harm to any person, commits a felony and shall, upon conviction, be sentenced to pay a fine of not less than twenty-five hundred dollars but not more than one hundred thousand dollars per day for each violation, or to a term of imprisonment of not less than one year but not more than ten years, or both.

(d) Separate offense for each day. Each day of continued violation of any provision of this article or any rule or regulation or order promulgated or issued pursuant to this article shall constitute a separate offense.

(e) Civil penalty. In addition to proceeding under any other remedy available at law or in equity for a violation of this article or a regulation or order of the department promulgated or issued hereunder, the department may assess a civil penalty upon the person for the violation. This penalty may be assessed whether or not the violation was willful or negligent. The civil penalty shall not exceed twenty-five thousand dollars plus five thousand dollars for each day of continued violation. In determining the civil penalty, the department shall consider, where applicable, the willfulness of the violation, gravity of the violation, good faith of the person charged, history of the previous violations, danger to the public health and welfare, damage to the air, water, land or other natural resources of the state or their uses, cost of restoration or abatement, savings resultant to the person in consequence of the violation and any other relevant facts. The person charged with the penalty shall then have thirty days to pay the proposed penalty in full or, if the person wishes to contest either the amount of the penalty or the fact of the violation, to file within a thirty-day period an appeal of the action with the department. Failure to appeal within thirty days shall result in a waiver of all legal rights to contest the violation or the amount of the penalty. Civil penalties shall be payable to the department and shall be collectible in any manner provided by law for collection of debts. If any person liable to pay a penalty neglects or refuses to pay the same after demand, the amount, together with interest and any costs that may accrue shall be a lien in favor of the department upon the property, both real and personal, of the person, but only after same has been entered and docketed of record by the county clerk of the county where the property is situated. The department may, at any time, transmit to county clerks of the respective counties certified copies of all such liens and it shall be the duty of each county clerk to enter and docket the same of record in his office and to index the same as judgments are indexed, without requiring the payment of costs as a condition precedent to the entry thereof.

§ 503-g. Enforcement and abatement. (a) Public nuisance. Any violation of this article or of any rule, regulation or order of the department or of any term or condition of any license or registration issued under this article shall constitute a public nuisance. Any person committing the violation shall be liable for the expenses of abatement of the nuisance. The department may recover the expenses of the abatement in a court of competent jurisdiction.

(b) Orders. In addition to other remedies provided under this article, to aid in the enforcement of this article, the department may apply to a court of competent jurisdiction for orders to persons as it deems necessary to protect health and safety. These court orders may include an order modifying or revoking registrations or licenses, orders to cease unlawful activities or other acts involving transport or possession of radiation sources that are determined by the court to be detrimental to the public health and safety and such other orders as the court deems necessary to abate public nuisances. An order issued under this section shall take effect upon notice, unless the order specifies otherwise. An appeal to the department shall not act as a supersedeas. It shall be the duty of any person to comply with any order issued under this section. Any person who fails to comply with an order issued under this section shall be guilty of contempt and shall be punished in an appropriate manner by the court, upon application by the department.

(c) Injunction. In addition to any other remedies provided for in this article, the department may institute a suit in equity in the name of the state for an injunction to restrain a violation of this article or the rules, regulations or orders adopted or issued hereunder, or to restrain the maintenance or threat of a public nuisance. In any such proceeding the court shall, upon motion by the department, issue a prohibitory or mandatory preliminary injunction if it finds that the defendant is engaging in unlawful conduct or is engaged in conduct which is causing immediate and irreparable harm to the public. The state and the department shall not be required to furnish bond or other security in connection with such proceedings.

(d) Impoundment. The department shall have the authority to impound any radiation source or to take other actions as are necessary to abate a public nuisance wherever the department believes that this action is necessary to protect the health and safety of the public.

(e) Emergency order. Whenever the governor finds that an emergency exists requiring immediate action to protect the public health and safety, the governor may issue an emergency order reciting the existence of the emergency and requiring that such action be taken as is necessary to meet the emergency. This order shall be effective immediately. Any person to whom this order is directed shall comply therewith immediately, unless such order is restrained or enjoined by a court of competent jurisdiction.

(f) Revocation of licenses or permits. Repeated violations of any provisions of this article or any rules and regulations of the department promulgated under the authority of this article or nonpayment of fees or penalties shall be cause for revocation of licenses or permits issued by the department under this article.

§ 503-h. Liberal construction. The penalties and remedies prescribed by this article shall be deemed cumulative and the existence of or exercise of any remedy shall not prevent the department from exercising any other remedy at law or in equity. No provision of this article or any action taken by virtue of this article, including the granting of a registration or license, shall be construed as estopping the state or department from proceeding in court to abate nuisances under existing law, nor shall this article in any other manner abridge or alter rights of action or remedies now or hereafter existing in equity or under the common law or statutory law, criminal or civil, exercised by the state or any person to enforce his or her rights or to abate any nuisance, now or hereafter existing, in any court of competent jurisdiction.

## TITLE 4

## FEES

Section 504. Licensing and registration fees.
504-a. Nuclear facility fees.
504-b. Creation of special funds.

§ 504. Licensing and registration fees. The department shall by rule and regulation set reasonable annual fees for the registration of radiation sources in transport and the licensing of radiation source users responsible for transportation of radiation sources. These fees shall be in an amount at least sufficient to cover the costs of administering the programs required by this article.

§ 504-a. Nuclear facility fees. (a) General rule. Persons engaged in the business of producing electricity utilizing nuclear energy, operating facilities for storing away-from-reactor spent nuclear fuel for others or fabrication of nuclear fuel or shipping spent nuclear fuel shall pay fees to cover the costs of the programs related to their activities as required by this article.

(b) Department fees. Each person who has received a nuclear power reactor facility construction permit from the NRC shall pay to the department within thirty days of the effective date of this article and by July first of each year an annual fee of one hundred fifty thousand dollars per power reactor, regardless of the number of reactors per site.

(1) Each person who has received or has applied for a nuclear power reactor facility operating license from the NRC shall pay to the department a one-time fee of two hundred thousand dollars per site within thirty days of the effective date of this article and an annual fee of one hundred thousand dollars per site payable by July first of each year, regardless of the number of power reactors per site.

(2) Each person who has applied for or received a valid license from the NRC to operate an away-from-reactor spent fuel storage facility

shall pay to the department an annual fee of fifty thousand dollars per site payable by July first, of each year.

(3) Each person who has applied for or received a valid license from the NRC to operate a reactor fuel fabrication facility shall pay to the department an annual fee of fifty thousand dollars per site payable by July first of each year.

(4) Each shipper of spent reactor fuel to, within, through or across the boundaries of this state shall pay to the agency a fee of one thousand dollars per shipment, payable prior to the proposed date of shipment.

(c) NYSP fees.

(1) Each shipper of spent reactor fuel to, within, through or across the state shall reimburse the NYSP for escort service at the following rates: twenty dollars per hour per officer and fifty cents per mile for highway shipments. Rail shipments shall be based on a rate of twenty-five dollars per hour per officer. If the shipment is canceled following NYSP notification, the shipper shall compensate the NYSP at an appropriate rate for four hours of officers' time.

(2) The NYSP may adjust the rates by regulation as prevailing wage rates and transportation costs change.

(d) Penalties. Any person violating any provision of this title shall be subject to the penalties and enforcement provisions of title three.

§ 504-b. Creation of special funds. (a) Radiation protection fund. There is hereby created in the department a restricted account to be known as the radiation transportation protection fund. Fees and penalties received under section five hundred four and the opening paragraph of subdivision (b) of section five hundred four-a of this title shall be deposited in this fund and are hereby authorized to be utilized by the department for the purpose of carrying out its powers and duties under this article.

(b) Radiation emergency response fund. There is hereby created in the department a restricted account to be known as the radiation emergency response fund. Fees received under paragraphs one, two and three of subdivision (b) of section five hundred four-a of this title shall be deposited in this fund as provided and are hereby authorized to be utilized by the department for the purpose of carrying out its responsibilities under title five of this article.

(c) Radiation transportation emergency response fund. There is hereby created in the department a restricted account to be known as the radiation transportation emergency response fund. Fees received under paragraph four of subdivision (b) of section five hundred four-a of this title shall be deposited in this fund and are hereby authorized to be utilized by the department for the purpose of carrying out its responsibilities under title six of this article.

## TITLE 5

## RADIATION EMERGENCY RESPONSE PROGRAM

Section 505. Declaration of policy.
505-a. Response program.
505-b. Financial assistance program.

§ 505. Declaration of policy. It is the policy of the legislature to protect the people of the state against adverse health effects resulting from transportation radiation accidents by establishing a mechanism for emergency preparedness to mitigate the effects of such accidents. The legislature finds that it is appropriate for the nuclear industry in the state to bear the costs associated with preparing and implementing plans to deal with the effects of nuclear transportation accidents or incidents.

§ 505-a. Response program. The department shall develop a radiation emergency response program. Any volunteer organizations which are included in the radiation emergency response program developed under the authority of this article shall be consulted prior to such inclusion. The radiation emergency response program shall include routing analyses for the routing of route-controlled transportation of radiation sources an assessment of potential nuclear transportation accidents or incidents, the radiological consequences and necessary protective measures required to mitigate the effects of such accidents or incidents. The program shall include, but not be limited to:

(1) Development of a detailed fixed nuclear emergency response plan for areas surrounding routes and accidents.

(2) Training and equipping of state and local emergency response personnel.

(3) Periodic exercise of the accident scenarios designated in the NRC emergency response plan.

(4) Provisions for financial assistance to municipalities, school districts, volunteer and state agencies as provided for in section five hundred three-b of this article.

§ 505-b. Financial assistance program. (a) General provisions. Applications by municipalities, school districts, volunteer organizations and state agencies to pay personnel, conduct training or purchase protective supplies and equipment principally required to carry out the purposes of titles five and six of this article shall be made to the department which shall make the disbursements pursuant to regulations.

(b) Reimbursement provisions. Municipalities, school districts, volunteer organizations and state agencies may apply for reimbursement of costs not previously recouped or to be reimbursed from other sources which were required to be expended, as a direct result of the preparation, establishment and testing of emergency response plans surrounding each nuclear transportation accident for personnel costs, training expenses, and protective supplies and equipment on or after the effective date of this article.

(c) Reports. On September first of each year, the department shall submit a report on its operations for the preceding fiscal year to the governor and the legislature. The report shall include a summary of the activities of the radiation emergency response program and activities pursuant to shipments of spent fuel, as provided for in titles five and six of this article, respectively, as well as a proposed operating budget, financial statement and a listing of applications received and disbursements or reimbursements made to municipalities, school districts, volunteer organizations and state agencies pursuant to titles five and six of this article and an analysis of the adequacy of fees established pursuant to sections five hundred four and five hundred four-a of this article.

## TITLE 6

## TRANSPORTATION OF SPENT NUCLEAR FUEL

Section 506. General rule.
506-a. Escort requirements.
506-b. Authorization.
506-c. Radiation transportation emergency response plan.

§ 506. General rule. It is unlawful for any person to transport upon the highways or rails of this state any spent nuclear fuel unless that person notifies the department in advance of transporting the spent nuclear fuel in accordance with 10 code of Federal Regulations 71.5(a) and (b).

*§ 506-a. Escort requirements. All shipments of spent nuclear fuel to, within, through or across the boundaries of the state shall be escorted by the NYSP.

§ 506-b. Authorization. Spent nuclear fuel shipments shall be authorized subject to the state's authority to delay individual highway and rail shipments due to specific holiday or safety considerations including, but not limited to, weather, highway or rail conditions.

§ 506-c. Radiation transportation emergency response plan. (a) Planning. The department shall develop the transportation emergency response plan to respond to accidents involving the shipment of spent fuel. The plan shall:

(1) Incorporate local agencies and volunteer organizations along the preprescribed routes for transport of spent fuel.

(2) Incorporate any state or local agency responsible for protection of the health and safety of the public as necessary and approved by the specific agency.

(b) Funding of state and local agencies. Funds received under paragraph four of subdivision (b) of section five hundred four-a of this article shall be used to train and equip state and local agencies and volunteer organizations in accordance with regulations adopted by the department to implement the plan.

§ 2. This act shall take effect on the two hundred seventieth day next succeeding the date on which it shall have become a law, provided however, that effective immediately, all actions and procedures with respect to the proposed adoption, amendment, suspension or repeal of any rule or regulation necessary to the timely implementation of this act are directed and authorized.

# TESTIMONY BY

# ASSEMBLYWOMAN JULIA HARRISON

# TESTIMONY ON TRANSPORTATION OF NUCLEAR WASTE

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Good morning Chairman Florio and Committee members. My name is Assemblywoman Julia Harrison. I represent the 26th New York Assembly district in North Queens, and I am the Chairwoman of the New York State Sub-Committee on Community Safety.

Rarely has an issue surfaced during the more than thirty years I have been involved as a community activist or the years I have been a public official that has distressed me as profoundly as the transportation of irradiated nuclear material through the streets and highways of our state.

The potential for disaster is horrifyingly real, and it is particularly such in the district I represent in Queens, specifically the Long Island Expressway and the connecting Clearview Expressway.

Accidents are inevitable. There are millions of trucks accidents on our nation's highways every year and our community is not immune~~d~~ from.

There will be, it is anticipated, ~~that~~ 250 to 300 truck loads of high level nuclear waste transported this year across the country. However, by the year 2000, just 15 years from now that number will increase to over 9000 shipments. I am not satisfied that the cask's integrity, truck safety, and the driver's training are sufficently adequate to properly insure the safe transportation of this volatile material.

After the back-log of shipments from the stroage pools at Brookhaven National Laboratories are removed, New York City will be exposed to 6 to 8 shipments a year ( the figure might vary according to up-time of the reactor and what shipping cask will be used to transport its waste). But a new threat looms over the city's residents, that will make the Brookhaven situation seem small by comparison.

The Long Island Lighting Company (LILCO) has just received a 5% start up license from the Nuclear Regulatory Commission for its Shoreham nuclear reactor. Even if the reactor does not receive a full power operating license and has to shut down, the fresh fuel that was loaded into the reactor vessel now has to be removed. This will create 260 truck loads not of spent fuel but of hot radioactive material.

If the plant does get its full power license, inorder for it to go into commercial use and to generate electricity, the plant, over its 40 year life expectancy will produce 2,600 shipments of nuclear waste - 65 a year - that's more than one a week. In the mean-time there has been no emergency evacuation plans required by the federal government.

In 1979, the federal government mandated that every nuclear power reactor have a workable evacuation plan. This occurred due to the March, 1979 accident at the Three Mile Island facility in Harrisburg. All nuclear power stations, including Brookhaven, have to have emergency planning. The Brookhaven reactor, a high flux beam reactor, holds 27 uranium fuel assemblies when operating, while the MH-1A nuclear shipping cask previously used to transport Brookhaven's waste holds 32 fuel assemblies.

Brookhaven, again, must have a workable emergency plan, but put its nuclear waste on the back of aflat bed truck, ship it at 55 mph on the highway through the most densely populated area in the country, with more fuel assemblies than the reactor holds and you don't have to have emergency plans!

As a State Representative from New York and chairwoman of the Sub-Committee on Community Safety, I recommend that an intergovernmental committee be established to promote the development of a coherent system of checks and controls to assure that maximum safety provails on any and all shipments over what ever route is ultimately agreed on.

I also urge upon your committee that you endorse the formation of guidelines which would define such measures that must be inplace inorder to respond to and cope with any emergency that may arise in the course of the shipments of any irradiated nuclear materials. Until such steps have been taken, I call for the immediate cessation of all shipments.

Thank you for your time.

TESTIMONY OF REPRESENTATIVE BARBARA B. KENNELLY
Subcommittee on Commerce, Transportation, and Tourism
August 1, 1985

Chairman Florio, thank you for holding this hearing today to examine the issues surrounding the application filed by the City of New York trying to block the shipment of spent nuclear fuel from Brookhaven National Laboratory on a route through New York City. I am certain that a complete investigation of New York City's application will clearly reveal that it should be rejected by the Hazardous Materials Transportation Bureau where it is now under review.

I am strongly in opposition to the application for preemption filed by New York City. At the beginning of this year, I formally submitted my comments in opposition to the proposal to the Hazardous Materials Transportation Bureau and I worked with my colleagues to ensure that the Bureau came to Connecticut to hear our concerns.

The City of New York claims there are three alternative routes superior to the one now allowable by the U.S. Department of Transportation directing the shipment of Brookhaven's wastes through New York. But the City has failed to prove its case that its suggested alternatives provide the public any more protection or safer transportation than what now exists.

The application of the City of New York is based on the idea that the shipment of the nuclear wastes through Connecticut would reduce the risk of an accident in an urban area. But Connecticut is one of the most densely populated states in the nation. While the concern to reduce public exposure as much as possible is certainly valid, the alternatives proposed by the City of New York involve the shipment of spent nuclear fuel through the urban centers of Hartford, Bridgeport, Waterbury and New London. It defies common sense to substitute one urban center with a set of other urban centers.

This is particularly true when you realize that the alternatives proposed by New York City and would involve longer and more circuitous routes than the straight path down the highways of Long Island. Indeed, the City of New York would have the shipments travel across the Long Island Sound, into the ports of Connecticut, and up and down the highways of the State through the City of Hartford. What's more, these routes would be significantly more expensive, even according to the Arthur D. Little report commissioned by New York.

New York City's proposals involve complicated intermodal connections of barges and trucks which would entail careful scheduling once the barges came into port. And that's not even mentioning the extremely important fact that by any measure Hartford does not have the best highway connections at the moment. Hartford has no Interstate beltway which would allow the shipments to bypass the City. And not only is there no beltway, but Hartford has one of the worst interchanges of two federal Interstate highways anywhere. Traffic in this interchange is already going to be tied up and disrupted over the next few years as Connecticut highway improvements are undertaken. It is would be dubious wisdom to add another complication to what are presently dangerous conditions. All of these factors mean that the New York City alternative routes would create an extremely difficult emergency response situation should an accident unfortunately occur.

Again, Mr. Chairman, thank you for providing me the opportunity to present my views to your Subcommittee.

ENVIRONMENTAL POLICY INSTITUTE

**TESTIMONY OF DR. FRED MILLAR**
**DIRECTOR, NUCLEAR AND HAZARDOUS MATERIALS TRANSPORTATION PROJECT**
**ENVIRONMENTAL POLICY INSTITUTE**

**BEFORE THE**

**SUBCOMMITTEE ON COMMERCE, TRANSPORTATION AND TOURISM**
**U.S. HOUSE OF REPRESENTATIVES**
**COMMITTEE ON ENERGY AND COMMERCE**

August 1, 1985

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

I appreciate the opportunity to testify before you in this hearing on the routing problems surrounding the shipment of nuclear waste. The Environmental Policy Institute is a national environmental organization specializing in energy, water, and agriculture issues.

The Institute was closely involved in the passage of the Nuclear Waste Policy Act of 1982 (NWPA), and we support the main thrust of that legislation towards a geological program for disposal of nuclear wastes as safe as possible and with substantial opportunities for participation in program planning by citizens and affected jurisdictions. We continue to follow closely the implementation of the NWPA, including the Department of Energy (DOE) planning for transportation of nuclear irradiated fuels to the repositories. We have been consultants on nuclear waste transport matters to the City of London, England, and the State of Utah, and have drafted model legislation for cities and states.

Current federal law puts nuclear waste transport squarely within the larger context of hazardous materials transportation. We have viewed nuclear waste transport issues as the leading edge of similar problems with hazardous materials transport. The Department of Transportation's (DOT) regulation HM-164, for example, (historically and expressly a federal preemptive response to New York City's ban and therefore at the center of the controversy at hand today), was narrowly crafted to apply only to nuclear materials transport by truck, but with an explicit DOT statement that further routing regulation for other cargoes and other modes was not precluded for the future.

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In nearly any discussion of nuclear cargoes, someone will argue, often presuasively, that there are more dangerous cargoes on U.S. highways and railways than even nuclear irradiated fuel, and that the former are less well protected in packaging. Public concern for and the visibility surrounding nuclear cargoes, however, has resulted in unchallenged federal health effects studies, for example, the Sandia "Urban Study" of 1979 (explicitly geared to New York City), which have outlined in detail the catastrophic effects that even a one percent release from a cask of nuclear irradiated fuel could have in a densely-populated area: thousands of latent cancer fatalities and up to $2 billion in property costs. We are not as well informed about the potential effects of phosgene gas, ethylene oxide, acrolein, and other ultrahazardous cargoes.

As this committee is well aware ard as the public at large is coming to appreciate, major safety improvements in the use and transport of ultrahazardous materials often seem to follow very serious accidents. Well-known examples of this unfortunate pattern would include improvements in major industrial hazards following the accidents at Three Mile Island, Seveso, Italy, and Linden, New Jersey; and the transportation safety improvements that have followed accidents at Crestview, Florida and Waverly, Tennessee.

Accidents and evacuations caused by hazardous materials cargoes continue to pepper the national media coverage, from widely scattered locales in the U.S. Arkansas has had perhaps more than its share in recent weeks. A 1984 study from the Association of American Railroads, based on historical accident data for the last ten years, says that in an average year the U.S. will experience 30 "serious" accidents with hazardous rail cargoes alone (each accident involving $100,000 in damages) and two "catastrophic" accidents (each involving damages of more than $1 million).

With an increasing volume of new and exotic chemicals in transport in the U.S. every year, and with the expected "dramatic increase" in high-level nuclear traffic in the coming years, we simply must learn the lessons from accidents experienced. Unfortunately, the major impact of these accidents is felt in widely scattered locations and their lessons often not assimilated in effective ways.

Accidents sometimes mean that old assumptions about what constitutes an adequate level of safety are brought into question. Perhaps the current New York City nuclear fuel routing dilemma can do the same. Certainly the old assumptions of the major nuclear shippers, DOE and the nuclear utilities, are being strongly brought into question as adequate when the result is shipment through the city.

We find the adamant DOE posture in this case to be unwise. In our testimony today we cite the example of Union Carbide as shipper of methyl isocyanate: the Bhopal tragedy was the occasion for the company to declare publicly that it shipped MIC in the U.S. with very special safety precautions that went far beyond the minimal federal regulations for its transport. We call on DOE as shipper to go beyond current federal requirements in resolving the nuclear fuel routing crisis in New York City and it environs.

We will also outline other issues in shipper responsibility for the routing of ultrahazardous cargoes, point out new technologies and opportunities for more rational shipper choices for safer routing, and mention some problems with the current minimum federal regulatory effort and areas for improvement.

## DOE AND NUCLEAR UTILITIES HAVE KEY RESPONSIBILITIES AS SHIPPERS OF IRRADIATED FUEL

Let us state at the outset that it is clearly unacceptable for the Department of Energy (DOE) to be planning to route hundreds or even dozens of irradiated fuel shipments by the truck mode from Long Island through New York City if there are in fact safer modes and/or safer routes of transport for this ultrahazardous material. This current situation for the relatively small number of DOE's Brookhaven shipments, which would also presumably hold for hundreds of future DOE shipments to a repository under the Nuclear Waste Policy Act(NWPA) for Long Island Lighting Company (LILCO) irradiated spent fuel from the Shoreham nuclear reactors, violates basic federal safety principles and provides a drastically unhelpful precedent for national policy in the shipment of nuclear wastes.

We call on DOE to assume, as a major shipper of nuclear materials currently and in the near future, the responsibility for a complete re-evaluation of storage and transportation alternatives for its irradiated fuel and for the choice of the safest storage programs, the safest mode of transport, and the safest routes. We urge the nuclear utilities to encourage DOE in this direction. Such actions by DOE would be the most appropriate way to fulfill its responsibilities under NWPA and would be broadly consistent with federal responsibilities under the Hazardous Materials Transportation Act (HMTA).

DOE has protested that as the shipper of the material, under current federal law it has no responsibility for and no choice in the routing, and that it is the Department of Transportation's (DOT's) nuclear truck routing regulation HM-164 that dictates the route through New York City. Since HM-164 applies only to the carriers of nuclear materials by truck, and requires that the carrier of high-level nuclear irradiated fuel choose an Interstate route and the route which minimizes travel time (using an Interstate beltway to avoid urban areas if one is available), DOE is technically correct. Unless New York State and

Connecticut can agree on a safer alternative route under HM-164 procedures, it seems the truck carrier of the DOE nuclear shipments is compelled to go through New York City.

DOE's major responsibility for this embroglio, however, is clear: DOE has chosen the mode of shipment, truck, in full knowledge that the only currently available route is through New York City. If this situation continues, it is a Phyrric victory for DOE. Such an adamant DOE posture can only increase the determination of other interested parties to seek Congressional remedies for the inadequacies of current federal agency policies and practices.

DOT has officially told DOE (in DOT's 1984 comments on the DOE "Mission Plan" for nuclear waste disposal under NWPA) that DOE, as a major shipper of highly radioactive cargoes, certainly could use its contracting process with carriers to direct that those carriers use only those routes that DOE has selected as safest. (Obviously, DOE could also in this process choose the safest modes and select carriers accordingly.) DOE should go the necessary extra mile to win public acceptance for its nuclear shipment programs by developing a comprehensive program of consulting with states and localities on a regional basis to develop preferred routes that in fact are the safest. (See Appendix A for DOE maps of most likely routes for nuclear wastes to potential repository sites.)

Later in this testimony we will outline what we have learned recently about the routing of hazardous cargoes by other major shippers, including Union Carbide and the Department of Defense (DOD), illustrating both the availability of new computerized technologies for choice of safest routing and the lack of systematic use of these by major shippers as well as the lack of adequate federal requirements or guidance even for the shippers of the most hazardous cargoes. It is vital that DOE and other major shippers of ultrahazardous materials take the lead in reaching workable systems of federal and non-federal regulation, based on two major principles:

- minimization of risks (not just of travel time, as in the high-level nuclear waste provisions of HM-164)
- public acceptance

Current nuclear irradiated fuel shipment "campaigns" (that's the term the nuclear utilities use) by DOE and by nuclear utilities are not broadly perceived as well-planned and based on adequate safety technology and routing. On the contrary, they appear to knowledgeable state officials as lacking any broad public policy rationale, and as based merely on the economic convenience of the nuclear utilities involved.

The recent West Valley shipments, for example, exemplified seemingly unnecessary shipments of irradiated fuel from a failed reprocessing facility back to several utility storage pools. The current shipments from Nebraska and Minnesota to Morris, Illinois, on the other hand, exemplify shipments from utility pools to a failed reprocessing facility. All perfectly legal, and DOE has no large role in these commercial dealings between utilities, but they illustrate that there is currently no overall sensible public policy for irradiated fuel management. The April 1985 proposal from DOE for a Monitored Retrievable Storage facility in Tennessee, which would necessarily increase the numbers of shipments and the mileage travelled by each irradiated fuel assembly, likewise illustrated that DOE is still lagging in its appreciation of the public's concern for nuclear transportation risks. (See Appendix B for DOE maps of routes for nuclear waste transport to the proposed MRS facility)

Ongoing shipments that seem unnecessary and not well planned by DOE and the nuclear industry and that are pushed through despite widespread public opposition are building up a bitter legacy which is likely to adversely affect future DOE efforts to win public acceptance for such shipments.

DOE's seemingly intractable posture in these issues is based partly on its position that radioactive transport risks are too low to warrant many of the safety improvements that many states and citizens are pressing for. One example of this stance is that, as an analysis by Dr. Marvin Resnikoff has shown, DOE predictions of the fraction of transport accidents severe enough to cause release of radioactive material have decreased amazingly by a factor of 690 in the past seven years. Predictions by DOE of the amount of material released in severe accidents have declined by a factor of twenty-one or more in the past four years. Partly because DOE is perceived as not taking transportation risks seriously enough, DOE planning for the NWPA shipments has been the target for articulate criticisms by states and groups of states in DOE-funded studies (See especially the 1985 documents and recommendations of Western Interstate Energy Board, whose "Statement of Principles" is attached as Appendix C).

The Association of American Railroads has recently told the nuclear industry, at a 1985 meeting of the Atomic Industrial Forum : "Despite a decade and a half of rhetoric, the railroads are not satisfied that the risks associated with the transport of spent fiel have been adequately identified and quantified; and that those risks will be manageable."

The New York City problem illustrates primarily the lack of and the need for a workable national policy for the increasingly visible and controversial national shipment programs by the nuclear utilities and by DOE of nuclear materials, whether research (e.g., Brookhaven and lots more, including foreign irradiated fuel from research reactors) or nuclear weapons (material, components, assembled) or commercial power plant nuclear wastes (under the Nuclear Waste Policy Act).

Beyond its responsibility for safety choices in mode and routing, it is in DOE's interest to take responsibility for working out a workable conflict resolution mechanism in cases like the New York City situation in which localities or states have seemingly conflicting interests regarding the routing of nuclear cargoes. On the assumption that the long-range interests of everyone are served when the safest modes and routes are chosen for dangerous cargoes, DOE may have to be provided with a Congressionally-mandated procedure for conflict resolution, such that all jurisdictions must participate in discussions towards a solution. But such a new mechanism must be similar to those mandated by Congress for waste disposal planning under NWPA, that is, based on carefully crafted processes and DOE risk assessments of comparative alternatives, and with provisions for thorough participation by affected jurisdiactions.

Under the NWPA, Congress gave DOE responsibility for safe shipment and disposal of nuclear irradiated fuel; DOE will take title to the fuel at the plant gate and move it to storage and/or disposal facilities. In the Act, Congress did not address transport issues in detail, understandably enough. The increasingly visible current problems in national regulation may warrant Congressional revisitation of the issues with NWPA amendments in the next year, unless better progress in resolving such problems is noted. Congress in any case needs to keep up vigorous oversight on the issues, and especially to keep in touch with state concerns, for example as exemplified in state comments on DOE's Draft Environmental Assessments for potential repository sites.

## THE NEW YORK CITY SITUATION HIGHLIGHTS BROADER PROBLEMS IN HAZARDOUS MATERIALS TRANSPORTATION

Some of the questions that arise in reflection upon the New York City situation point to broader problems in hazardous materials transportation:

o Could a similar unacceptable situation arise in regard to future DOE shipments of nuclear materials? What does the intractable DOE position on shipments through New York City portend regarding how DOE will ship under the NWPA and especially whether DOE will accept civilian (DOT and NRC) regulation of the DOE's weapons wastes in transit to the DOE repository?

o Are other major shippers of hazardous materials similarly intent on maintaining traditional shipping routes through New York City or other major metropolitan areas?

o Is the admittedly minimal structure of federal regulations too minimal?

o How can a conflict resolution mechanism be found for cases where densely populated cities wish to re-route shipments of dangerous cargoes in such a way as to be in fact "exporting risks", even if the risks are thereby lowered overall?

o Who decides whether certain ultrahazardous shipments are in fact necessary (or could be eliminated in favor of other storage or treatment options)?

The main underlying problem here for public policy: the lack of clear shipper responsibility for safety and political acceptability of ultrahazardous shipments. What is common between DOE and other major private shippers of the most hazardous cargoes is that these shippers wish to retain as much "management discretion" as possible in key transportation safety decisions:

- determining the need for given shipments
- assessing risks of different modes and routes
- determining levels of safety that will be achieved by various technologies: container designs, routing, placarding

Shippers and carriers therefore have been vigorous in opposing federal, state and local government safety regulation beyond a bare minimum, even in localities like Denver and New York City where recent serious accidents have given public officials broad public support for increased regulation of hazardous cargo routing. The American Trucking Association has also been active in court challenges to virtually every jurisdiction that has recently enacted substantial new legislation: Pennsylvania, New Hampshire, New York City, and Boston among others. Shippers and carriers have also exercised enormous power in influencing even the decisions that have been made in government regulation, for example, in the dominant role played by the railroads in rail tank car safety standards. This example has had particularly disastrous results, as body counts in Waverly, Tennessee and elsewhere have borne out.

As the State of Wisconsin has pointed out in a petition to the Nuclear Regulatory Commission (NRC), there is no public official input in decisions currently made by private nuclear utilities as to whether to ship irradiated fuel to available private storage pools, even if such shipments entail public risks in transit with no corresponding benefit in safer storage. Such a determination of need will be made with NRC guidelines under NWPA only in regard to possible shipments to a federally-operated away-from-reactor storage facility.

The federal government contributes mightily to the lack of public accountability by shippers of dangerous cargoes by its role in insulating these companies from the public. One main mechanism for maintaining virtually complete management discretion in crucial safety decisions is to encourage/tolerate a seemingly pervasive (on paper) but actually token system of minimal federal regulations by industry-dominated federal agencies that allow virtual self-policing by the industries involved. This system allows shippers and carriers to hide behind the skirts of the federal agencies in several ways:

o Preemption: states and localities can be bullied by exaggerated assertions of federal preemption and threats of expensive lawsuits. If states and localities persist in enacting more vigorous regulation, federal agencies and ultimately the Congress are sought out by shippers and carriers for premptive rulemakings (e.g., DOT's so-called "Inconsistency Rulings") and for amendments to the HMTA that will cut off the currently substantial opportunities for state and local regulation (witness the "Hazardous Materials Coalition" proposal in recent sessions).

o Liability: meeting minimal federal standards can shield companies from claims of safety negligence

o Information: if even the federal government with its vast resources does not collect information on some safety topic, e.g., on the flows of truck traffic of the most dangerous cargoes, companies can suggest that states and localities are not appropriate levels for such collection.

Various critical reports in recent years, the result of thorough research by the U.S. Senate Commerce Committee (1979), the U.S. General Accounting Office (1982) and the National Transportation Safety Board (1982), have shown that the federal agencies know nearly nothing of the hazardous materials transportation industry they purport to be regulating. Even the information they pretend to have, e.g., the Hazardous Materials Incident Reporting System on hazardous materials accidents, is so widely acknowledged as so unreliable as to be virtually worthless, and DOT has not even bothered to study how underreported the data are.

The Bhopal disaster in India brought to light in the U.S. the shipment pattern of a single extraordinarily dangerous commodity, methyl isocyanate (MIC), produced by Union Carbide in West Virginia and distributed by rail and truck to five other U.S. locations and two foreign countries. It seems, however, accurate to assert that no federal official knows the distribution pattern of the several other poisonous liquids and gases in commerce that are similar to MIC in hazardous potential.

Phosgene, for example, the "mustard gas" used against troops in World War I, is more widely used in the chemical industry than MIC, but not as widely as chlorine. The DOT Emergency Response Guidebook evacuation distance tables suggest a downwind evacuation of 5.2 miles for a serious spill of phosgene. Nonetheless, no federal agency tracks the flow of phosgene on highways and rail lines in the U.S., much less tries to assess the safest routes and the adequacy of emergency response capabilities in the communities through which it moves. Will it take a scary accident with phosgene before we learn even where it is?

One egregious example of an attempt by federal agencies to shield shippers of hazardous cargoes from public scrutiny was the ill-fated attempt by the Nuclear Regulatory Commission in 1980 to get Congress to enact legislation that would keep secret the routes of nuclear waste shipments in the U.S. Congress promptly rejected that scheme and mandated public information on routing and prenotification of State Governors.

Some will assert that the liability concerns of shippers constitutes a major force for safety, and that regulation whether federal or nonfederal is a minor factor. This may be true, but not necessarily desirable. There mav in fact be some cases in which a particular commodity is considered too dangerous for some major company to handle from a liability perspective, and which is therefore handled and transported by companies which have less to lose -- they are smaller, therefore would be bankrupted by a serious accident.

The minimal federal program both encourages and necessitates increasing safety regulation by states and cities. The federal response is in large part discouraging, and tends to focus narrowly on admonishing cities not to engage in "exporting risks" to other jurisdictions. The New York City nuclear routing case can in this context be seen as a particularly vexing example of an artificially induced crisis in metropolitan relations, because HM-164 puts the burden for choosing the safest and politically acceptable routing on cities and states instead of on the shipper.

The conflict highlights the need for rationality in federal guidance for safety choices by shippers and states or localities. Luckily there are some federal resources and policies available for states and cities active in this area. (See my article from The International Fire Chief magazine, May 1985, attached as Appendix D.)

What is at stake in the New York City routing dilemma that makes DOE so intractable? Despite obvious and corrosive public relations difficulties for DOE, LILCO, and indeed all U.S. nuclear utilities occasioned by the New York City situation, it is a matter of preserving old principles relied on for many years by hazardous cargo shippers:

- With a very few exceptions, all modes of transport are acceptably safe for even very poisonous cargoes, even for shipment through highly populated areas.

- The federal government will specify minimal, but presumably acceptable, levels of safetv in packaging .

- There will be very little or no federal regulation or standards or enforcement in any of the other major safety areas: emergency response, routing, enforcement, risk assessment, driver training.

Reversal of this basic shipper stance would be a major change in the status quo. New York City could be the foot in the door, opening up basic arrangements for re-examination the way the Bhopal incident has for the chemical industry.

## THE DENVER TORPEDO TRUCK ACCIDENT ILLUSTRATES THE IRRATIONALITY OF FEDERAL HAZMATS ROUTING AND THE PUSH FOR INCREASED REGULATION BY CITIES AND STATES

The recent Denver accident with "war-ready" Navy torpedoes, and DOD Secretary Weinberger's response to the effect that DOD takes no responsibility for the routinq of its hazardous cargoes, leaves many with the impression that the routing of government shipments of hazardous cargoes by various agencies may not be rational, i.e., based on reduction of risks. "What the hell was that Navy torpedo truck doing in the middle of Denver, anyway?"

This was only one of the questions that tens of thousands of Denver motorists and Denver fire officials were able to reflect upon at some length as they sat in what the Governor of Colorado termed "the largest traffic jam in Colorado history" beginning with the Wednesday morning rush hour on August 1, 1984.

Both of the major Denver Interstates, I-70 and I-25, were closed down three to five miles in all directions for eight anxious hours. A truck loaded with six Navy topedoes, each with 655 pounds of (non-nuclear) Class A explosives, turned over at 5 A.M. and slid 104 feet down an exit ramp in the notoriously poorly-designed "Mousetrap", the interchange between the two Interstates intersecting in the city of Denver.

The other main question Denver emergency response officials were asking for several hours was: "Where the hell is the Navy (and the Army)?" The Denver Fire Department personnel were prompt and competent on the accident scene, but were in need of expert advice on what they were dealing with (an unknown liquid was leaking from the truck) and how big an area to evacuate. They called the three emergency numbers supplied on the truck's shipping papers; none answered. CHEMTREC put the Fire Chief in touch with a Navy duty officer in Washington,D.C., who could only advise by phone that the torpedo warheads were not armed, but that the firefighters should not try to upright the truck.

Worried Denver officials began a limited and conservative evacuation of local residents at 9 A.M. The Navy explosives experts finally arrived into Denver by commercial airline from California at 2 P.M., nine hours after the accident. The Army's experts flew in from a base only 80 miles away, arriving by "Huey" helicopter nearly four hours after they had been notified. The truck was eventually uprighted safely and towed to the Rocky Mountain Arsenal.

No one got hurt, but tens of thousands got their attention focussed on the irrational routing of hazardous cargoes through major cities and on the serious gaps in federal emergency response capabilities. Denver's Mayor Pena fired off a letter expressing his "outrage" to President Reagan, questioning why the 1.5 million people of the Denver area should be exposed to the risks of "nuclear, hazardous and other dangerous materials" being transported on major highways through the city. He labeled the federal response to the torpedo accident "grossly negligent", and said that "national security" would no longer be a cloak over federal shipments of dangerous cargoes through Denver.

The potential for catastrophic transportation accidents in densely populated areas was shown in the July 1978 explosion of a truck carrying Liquified Petroleum Gas on a road next to a crowded trailer camp in Tortosa, Spain: 200 people were killed instantly and 120 more were burned severely. In the U.S., what looks like a reasonably safe operating record over a period of time can go bust in a hurry, as evidenced the three big rail explosions in 1977, by Amtrak's recent accidents and by the Burlington Northern's three fatal train collisions within three months in mid-1984.

"There oughta be a law." There is a federal law, it turns out (49 CFR 397.9), almost completely ignored by the trucking industry, that says trucks carrying hazardous materials cargoes should not go through cities. The language of the law is quite strong: such hazardous cargoes must "not go through or near heavily populated areas, places where crowds are assembled, tunnels, narrow streets, or alleys," unless there is no "practicable alternative" from a safety standpoint. "Operating convenience is not a basis [for the shipper of hazardous cargoes] for determining whether it is practicable" to avoid such places of high risk where a serious accident could have catastrophic results.

This is the only federal hazardous materials routing rule, and has been on the books since 1940, in the form of an old Interstate Commerce Commission rule. In 1950 a Federal District Court case (U.S. v. Boyce Motor Lines, 90 Fed. Supp. 366 (1950), discussed the rule and concluded it was invalid "because of its failure to define an ascertainable standard of guilt" (i.e., too vague).

In 1969, however, as a result of "a number of near disasters..." (see Federal Register, March 13, 1971, pp. 4874 ff.) DOT regulators re-wrote the rule expressly to remedy the vagueness problem, and the outcome was the "Operating convenience" provision. DOT has no idea of what routes are actually used by truckers of hazardous materials, not even collecting the route plans required to be devised by the companies carrying explosives in compliance with 397.9 (b). DOT has never studied the extent of compliance with 397.9.

Congress specifically upheld the 397.9 routing rule in 1984, in Section 206 (b) of the Motor Carrier Safety Act of 1984, Public Law 98-554, 98 Stat. 2829; see Congressional Record, October 11, 1984, p. S 14380). Several states and cities have adopted 397.9 and other parts of 49 CFR regulations on hazardous materials safety.

The torpedo truck that overturned in Denver was headed from a Navy submarine facility at Keyport in Washington State to the sub base at Groton, Connecticut. The driver was following a handscrawled route plan she had taken by telephone from her dispatcher, which mysteriously directed her to dip down south two Interstates and go through Denver.

The trucking company which took the six Navy torpedoes through Denver could be cited for routing violations by the city of Denver and the state of Colorado, since both jurisdictions have adopted the federal law. But if the federal Department of Transportation (DOT) were to cite the company, it would be the first such citation issued by DOT since the law was rewritten in 1969, according to documents obtained from DOT under the Freedom of Information Act. With such obvious non-enforcement, it is no wonder that the federal law can be treated with contempt by the trucking industry. And no wonder that states and localities are increasingly determined to enact their own local regulations to protect public health and safety from the risks of the increasing volumes of dangerous cargoes on the rails and highways. Fire chiefs usually spearpoint the cities' efforts along these lines.

The railroad industry carries the most hazardous cargoes, huge jumbo tank cars, right through densely populated cities, without any federal routing regulations at all. After a series of disastrous explosions of rail tank cars in 1977 put a lot of bodies in graves, the tank cars were belatedly retrofitted with new safety devices. An aroused Congress also directed the DOT to study the feasibility of avoiding populated areas with dangerous rail cars. The DOT studies say that in some cities such rerouting could substantially reduce the risk of catastrophic accidents, and DOT has produced the computer databases that the major shippers of hazardous cargoes (i.e., chemical companies, nuclear utilities, the military) could be using to make rational routing choices for their most hazardous cargoes.

We simply do not know whether any are doing so. The trucking companies and railroads are free to choose their own routes. It may be that after an initial period of substantial non-compliance with HM-164 discovered by DOT in paper reviews of route plans submitted by truckers, most truckers are now at least using Interstate beltways to avoid cities. But who knows if using routes to minimize time in transit, as directed by HM-164, results in routes which minimize risks: e.g., avoiding population centers and transport corridors with high accident rates?

Union Carbide will not reveal its shipping routes for MIC. Secretary of Defense Weinberger said after the Denver accident that the DOD "issues no specific instructions to motor carriers regarding routes" and accepts no responsibility for the routing of shipments of military explosives and other hazardous materials. It is no longer a secret that the highly visible and much-protested nuclear weapons "White Trains", shipped by the Department of Energy, have moved through major cities. Less is known about whether the better-disguised nuclear weapons trucks try to avoid cities.

The terribly slow response times of federal emergency experts in the Denver case is important and disheartening evidence. The shippers of nuclear wastes, military weapons, and other highly hazardous cargoes make no pretense that the local firefighters who have to respond first to an accident have adequate training to handle serious problems. And the shippers and carriers resist strongly the imposition by local and state governments of permit fees that could pay for substantially raising the standard of training and equipment for emergency responders. Instead there is often the confident assertion that federal emergency teams will be within easy range to help out in any serious situation. The Denver experience raises some doubts about that notion.

Eighty percent of the firefighters in the U.S. are members of volunteer departments, hardly well-trained in emergency response to serious accidents. In 1977 a derailed and leaking tank car being monitored by firefighters in Waverly Tennessee blew up after two days, killing 19 fire service personnel and levelling the town. Even in major cities, the professional fire service often cannot deal adequately with the chaotic conditions in real accidents involving serious spills of one of the many new exotic dangerous materials being shipped in bulk. The fire chief in Somerville, Massachusetts, a suburb of Boston, on the scene of a derailed tank car spilling phosphorus trichloride in 1980, had 30 experts from industry and government giving him conflicting advice for six hours. He followed the federal guidelines and sprayed water on the tank car three times, each time creating an acid cloud that eventually forced the evacuation of thirty thousand people. His comment in retrospect: "Boy, we sure learned the hard way that was the wrong thing to do."

There are an estimated 412,800 tank trucks and 160,000 railcars that regularly transport hazardous materials, and the relevant federal agencies have 9 full-time inspectors for the trucks and 16 for the railcars in the whole country. With such obvious gaps in the federal ability (and willingness) to regulate hazardous materials transportation, states and localities are increasingly forcing some rationality in an unregulated situation by imposing restrictions on the routes and times that such dangerous cargoes may move.

Cincinnati, Ohio recently started fining truckers of hazardous cargoes $75 for taking the Interstate-75 route through the city instead of the beltway route around. Dallas, Houston, Boston, Portland, and New York City all have routing regulations and/or curfews on transport of hazardous cargoes. Of course the chemical and trucking industries, the feds, and overworked city attorneys often recite the myth that the federal government inevitably crushes such regulations as too burdensome on Interstate Commerce. But knowledgeable officials and citizens can challenge that myth by referring to recent important U.S. Court of Appeals decisions upholding safety rules imposed on truckers by Pennsylvania, New Hampshire, and New York City. Cities and states in fact under the Hazardous Materials Transportation Act of 1974 have considerable latitude in imposing rational routing choices on the shippers of the most hazardous cargoes and in raising the funds for adequate training and equipment.

In April of 1985 the Denver City Council unanimously enacted a strong permit and routing ordinance on hazardous materials transportation, nuclear and non-nuclear, rail and highway. Only the expenditure of much political capital by the trucking industry prevented a new state law from being passed simultaneously in Colorado. The public is increasingly intolerant of the shippers of the most hazardous cargoes who impose risks on cities and other high-risk areas. Opposition to high-level nuclear waste shipments is especially evident, yet a big increase in such shipments is just beginning. Chlorine, LPG, gasoline and other cargoes of course pose their own risks of serious accidents.

Relying mostly on industry and federal agencies to protect the public from the risks of these cargoes seems unwise. Local and state officials, responsible to those who suffer injuries and to those who must respond to accidents, can impose a rational routing system: shippers should have to show that they have used an acceptable method of choosing the safest routes. All high-risk areas cannot be avoided even by the most dangerous cargoes, but those shippers who put cities at risk by using them as corridors for their hazardous shipments (often with no origin nor destination within the city) should pay permit fees ("user fees") to fund adequate safety regulation and emergency response training and equipment .

## SOME LESSONS ABOUT ULTRAHAZARDOUS CARGOES LEARNED IN THE U.S. BECAUSE OF THE BHOPAL DISASTER

Reverberations from the Bhopal disaster have been felt in the U.S. hazardous materials transportation sector and already are having an impact on federal regulation. The National Transportation Safety Board (NTSB) promptly criticized the current DOT regulations for shipping MIC and similar poisonous cargoes as inadequate; DOT agreed and is now revising its regulations, in Docket HM-196 (not to the satisfaction of NTSB).

Union Carbide and FMC Corporation, shippers of MIC in the U.S., have both declared that they ship MIC in ways that are significantly more safe than federal regulations require. Both shippers claim to be using safer tank cars, additional placarding, and special routing technologies to avoid densely populated areas and areas with high accident rates. Some interesting questions arise:

o Will these companies share with federal and local officials information on exactly what routing technology they are using, and what the routing results are? Union Carbide, although listed as a client by the ALK Associates company in Princeton, New Jersey, which markets the state-of-the-art routing technology, has refused to do so in response to an EPI inquiry.

- o If the federal regulations are so minimal, might not some companies less well-heeled than Union Carbide in fact be shipping poisonous cargoes in inadequate containers and with inadequate attention to hazard identification and through cities?

Comments by major chemical companies and by NTSB on the DOT Docket HM-196 likewise raise pointed questions about DOT safety standards for the most hazardous cargoes:

- o If so many special precautions [see FMC comment] are taken by shippers of MIC, what about the other chemicals similar in hazard (several are listed by companies in their comments)?

- o Is the proposed rule in HM-196 too narrow in scope, e.g., excluding acrolein and fuming nitric acid which have similar hazards to MIC [NTSB] or too unwieldy [3M Company, Southern Pacific] or does the rule set an unduly high threshold of toxicity [NTSB]?

It seems crucial at a minimum that federal agencies which have substantial expertise in toxicology (DOT has one chemist for these matters) should comment on the proposed rule and facilitate a workable framework for regulation of MIC-like gases.

There is currently no federally sanctioned "short list" of the most dangerous cargoes in transport or storage, such that federal officials might have a priority list of cargoes about which to do routing studies or special enforcement of existing regulations, or so that a state official or fire chief could have some priority listing for special attention or regulation. DOT abandoned an attempt to put together such a list in a regulatory way, but there are three existing federal lists that are possible places to start:

- o The Coast Guard's very short list of "Cargoes of Particular Hazard" when carried in bulk by ship or barge.

- o The list of 50 chemicals in the "Evacuation Tables for Selected Hazardous Materials" in the DOT Emergency Response Guidebook (the "orange book"), 1984 edition.

- o The chemicals listed as requiring Package Group I containment under the United Nations system (see DOT's Optional Hazardous Materials Table, 49 Code of Federal Regulations 172.102, column (6)).

All over the world, after Bhopal, officials are trying to devise priority "short lists" for additional regulation, with beginning efforts to specify quantities in storage or transport that would require special attention. Such efforts have been conducted by the World Bank, the British Health and Safety officials, and a new short list will be forthcoming in a matter of days from the U.S. Environmental Protection Agency.

We urge Congress to investigate ways to see that a useful short list is developed for the most hazardous cargoes, and that at least a few case studies are conducted to survey the overall system of distribution/transportation/storage of some of the most dangerous cargoes. Such case studies would ascertain, at a minimum, if such cargoes are routinely through densely populated areas in violation of 49 CFR 397.9, and might well be accompanied by some pilot efforts in a few cities to develop model enforcement programs that could assist nonfederal jurisdictions who desire to enforce that regulation.

As we see the HMTA, it is strongly and clearly:

(a) a safety act (not a keep-the-cargoes-rolling through uniformity Act)

(b) an act that sets out a balanced partnership arrangement between feds and state/local regulators (not blunt and total federal preemption)

So any re-direction of federal policy here has to be not only technically working towards safety, but also broadly politically acceptable to state and local officials who realize they have a role in hazardous materials transportation regulation.

The public and public officials are going to take actions to control major chemical hazards, as evidenced by actions already taken by such parties as the European Community (the Seveso Directive mandating new regulations in every European nation), local officials in Santa Clara and Los Angeles, California, and the New Jersey Department of Environmental Protection (the short list for vigorous regulation is six chemicals). Shippers of very hazardous cargoes, including the DOE, can ill afford to rely on outmoded and static assumptions.

Even if there is no realistic expectation of substantial new federal help to state and local jurisdictions in improving the safety of hazardous materials transportation, at least one can hope that the federal government will not hinder their efforts with new preemptive legislation and rulemaking.

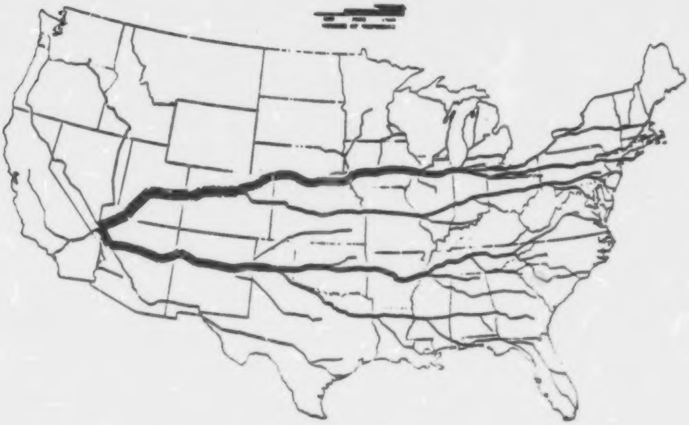
ENVIRONMENTAL POLICY
INSTITUTE

FRED MILLAR, Ph.D.
Director
Nuclear and Hazardous Materials
Transportation Project

218 D Street, S.E., Washington, D.C. 20003 (202) 544-2600

APPENDIX A

PROJECTED ANNUAL SPENT FUEL SHIPMENTS
TO A WESTERN STORAGE SITE IN 2004
BASIS: TRUCK SHIPMENTS FROM ALL REACTORS
(FOR DEMONSTRATION PURPOSES ONLY)

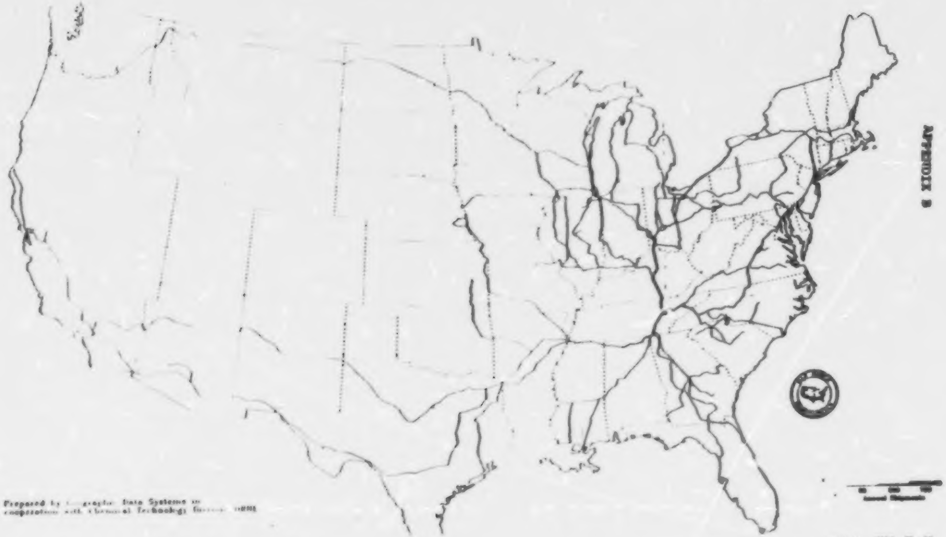


EPI comment:

This ORNL map shows a southern Nevada waste storage or disposal site creating a nuclear waste funnel with massive waste corridors from the Eastern and Midwestern reactors, along I-40 from TN to NEV and along I-80, I-80/90, I-80, I-76, I-70 from PA to NEV.

## POSSIBLE ROUTES FOR SHIPMENTS OF SPENT FUEL TO A CANDIDATE MRS SITE LOCATED NEAR OAK RIDGE, TN

(Basis: 100% Rail Shipments)



Prepared by Geographic Data Systems in cooperation with Chemical Technology Division, ORNL

ORNL-TM [illegible]

## APPENDIX C

## WESTERN INTERSTATE ENERGY BOARD HIGH LEVEL RADIOACTIVE WASTE COMMITTEE STATEMENT OF PRINCIPLES

The principles of planning for transportation should be in harmony with the Congressional statement of findings and purposes of the Nuclear Waste Policy Act in Section 111. Three basic points apply:

1. Spent nuclear fuel and high level wastes create potential risks; it is the responsibility of the Federal Government to protect the public health and safety and the environment for this or future generations.

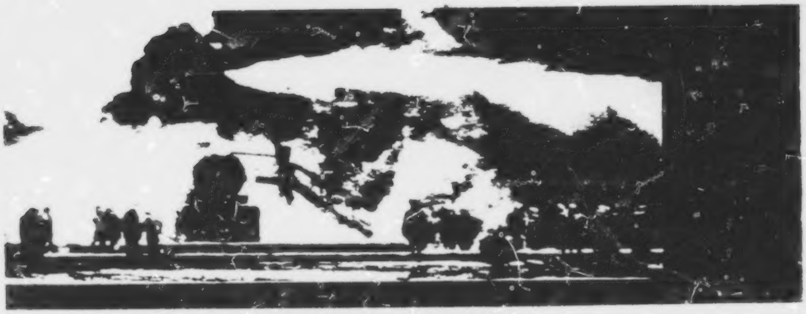
   - For transportation, this means DOE's planning should proceed on the assumption that an accident in which radiation is released is credible.
   - For public communications, this means DOE should recognize that expressions of public concerns, whether data- or value-driven, are legitimate and should be addressed substantively.
   - DOE should identify uncertainties and the factors that affect transportation safety and then identify those factors that will reduce risk and uncertainty.

2. Costs of the disposal are the responsibility of the generators and owners of the waste.

   - For transportation, this means DOE's Nuclear Waste Fund should finance a level of transportation safety that will give reasonable assurances that the public and the environment will be adequately protected.
   - DOE should identify the categories of costs it considers to be properly borne by the Nuclear Waste Fund, for example, emergency management and clean-up costs.
   - DOE should specify which categories of costs should be guaranteed by other sources.

3. State and public participation in the planning and development of the waste disposal system is essential to promote public confidence.

   - For transportation, DOE should work actively with the states and the public at all stages in the planning process for transportation safety and the determination of how costs should be allocated between the Nuclear Waste Fund and states, with particular emphasis on corridor states.



# HANDLING THE MOST DANGEROUS CARGOES:

## Are Transport Laws The Best Way?

by Fred Millar, Ph.D.

N[illegible] surprisingly the American chemical industry is widely reported by Chemical Week to be [illegible] leak [illegible] at Union Carbide's Bhopal, India plant, which killed at least [illegible] people [illegible] Martin [illegible] came hard on the heels of a November 1984 explosion [illegible] liquefied gas storage tank [illegible] chemical leaks have occurred in [illegible] the same [illegible] toxic cloud from Linden, New Jersey's American Cyanamid plant drifted over Staten Island and ten other communities.

### Local Officials Taking Action

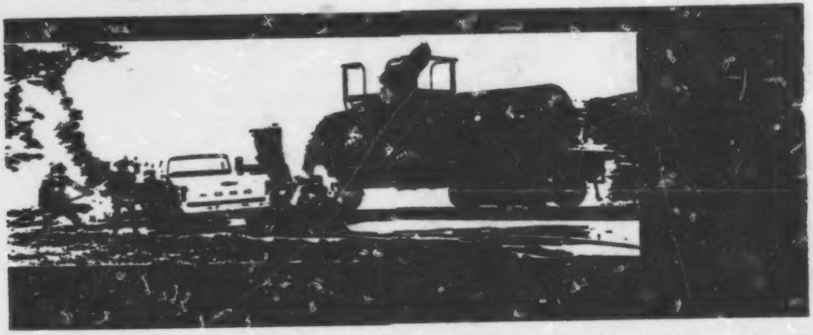
With calamities and near misses seeming more frequent, state and local officials have acted faster in enacting stringent safety legislation than their federal counterparts. Chemical companies are [illegible] major transportation routes that they continually are assessing risks at their facilities and using new computerized techniques for [illegible] the safest routes. The model local ordinance shown in the box illustrates one way to mandate the latest prevention techniques for transporting hazardous materials.

[illegible] happen [illegible] concentrated on the potential for disaster during transportation of poisonous and explosive cargoes by rail, highway and pipeline through American communities. The worst industrial disaster in the United States was triggered by a transport accident in 1947 [illegible] exploded and caused a nearby plant and another nitrate freighter [illegible]

Accidents [illegible] are more commonplace than many realize

A 1984 study by the Association of Railroads states that we can expect 30 "serious" hazardous railcar accidents (personal injury and property costs of $100,000 or more each) and two "catastrophic" accidents (over $1 million each) to occur in this country each year.

Emergency response capabilities for handling serious accidents with hazardous cargoes are widely recognized as inadequate. Upgrading training and equipment is a high priority for fire chiefs and other officials involved in safety.



## Chemical Industry Polices Itself

The tradition of letting the chemical industry police itself in safety matters has contributed to a lack of response capabilities in communities near plants or rail and highway corridors. Often, only the company itself holds crucial information and the capability for emergency response. And, equally often, local officials receive very tardy notification of even serious leaks. Take as an example the recent off-site leak of methyl isocyanate (MIC), the same gas as was released in Bhopal, by FMC Corporation in Middleport, New York. That incident sent children to the fire house to have their eyes washed out.

The industry's policing monopoly amounts to a still more basic safety strategy: using rational methods to prevent accidents that could have the most severe consequences.

One common-sense principle with precedent in federal law is to avoid putting dense populations at risk from the citing of the most dangerous facilities near cities or from the routing of the most hazardous cargoes through them. It seems in everyone's interest, for example, to ensure that shippers of such cargoes route rationally to avoid special hazards like populated areas, routes with high accident rates, and areas where a serious spill could impair a vital water supply.

## Lack of Information

Local officials, however, sorely lack information on wh high-hazard cargoes are tran ported through their communitie and what risk-control measure can be mandated by local ord nance. Any sensible local ord nance must put the tools for info mation and risk control in th hands of local officials in order t prevent the worst consequences a serious accident.

One significant fact to emerg from the Bhopal tragedy is tha Union Carbide transports meth isocyanate by rail and highwa with much more respect for i catastrophic potential than th federal regulations require. Th company apparently uses one c the computerized "safest routing methodologies called for in th model ordinance outlined here.

But MIC is used in only fiv chemical plants in the U.S. Wha about other ultrahazardous chem icals with widespread distributio by rail and highway? Union Ca bide and other companies have n been willing to reveal what meth ods are used for any given produc nor have they indicated wha other ultrahazardous product should be specially routed to avoi highest-risk areas, much less which cities are avoided by risky cargoes and which are not.

The success of the "community right-to-know" movement in more than 40 cities and a score of states makes such withholding of information look like a holdover from the era of the robber barons. The American Trucking Association, for example, demonstrated a "public-be-damned" mentality when it sued recently to strike down the ordinances of Boston and New York City that reroute dangerous cargoes away from crowded downtown areas.

The chemical companies assert that it is clearly in their own liability interest to ship ultrahazardous chemicals as safely as possible, but they resist having public officials play a more active role in overseeing the safety decisions that have up until now been left to company discretion.

**Ordinances Must Be Rational**

No local ordinance can stand court scrutiny if it is based on a simplistic "not in my backyard" stance. Any new state or local legislation will prevail only if it is rational and yields a plausible increase in safety. Genuine risk-reduction principles must be involved, such as isolation of dangers from populations whenever feasible. One basic federal guideline for rerouting hazardous trucks is that the safer alternative route be chosen. As the *Denver Post* soberly editorialized the day after the August 1, 1984, torpedo truck accident in that city (see *International Fire Chief*, February 1985, pp. 21-23), "The society's most dangerous products should be denied access to its most crowded places." The calamities at Bhopal and Mexico City should establish the wisdom of that conclusion.

A second basic "rationality" principle calls for the fire chief to consult with affected adjacent jurisdictions, for example, in designation of routes for hazardous trucks. A densely populated city trying to reroute hazardous cargoes does not have to agree if the adjacent smaller communities protest; no conflict resolution mechanism is available except for informal consultation and perhaps a court case.

The model local ordinance summarized here deals with the transportation of hazardous, including radioactive, materials, using federal definitions in Part 49 of Code of Federal Regulations (49 CFR). It adopts whatever relevant parts of the federal regulations the city or county would find useful to be able to enforce. An example could be the existing federal regulation (49 CFR 397.9) that forbids hazardous truck cargoes from coming through cities.

The model ordinance also has some provisions specific to information collection for rail hazardous cargoes, to transport-related storage of hazardous cargoes

### Key Features of Model Local Ordinance on Hazardous Materials Transportation

- Applies to all modes of transport.
- Adopts relevant parts of Code of Federal Regulations, related to transport of hazardous materials.
- Designates initial list of Hazardous Materials Presenting Highest Risks and subjects these to additional regulations:
    - Authorizes Fire Chief to collect all available information.
    - Requires Certificates for Hazardous Transport annually.
    - Authorizes Fire Chief to require advance notification, escorts and inspections if necessary.
    - Requires shippers to furnish information and show that risk-minimization methodology has been used and safest routes have been chosen.
    - Authorizes Fire Chief to require additional showings concerning emergency response and container testing if necessary.
    - Requires shippers to pay fee related to relative hazard of the material transported. Establishes Hazardous Materials Emergency Preparedness Fund.
- Authorizes Fire Chief to designate routes and conduct periodic risk analyses.
- Establishes initial restrictions on hazardous materials transport: prohibits certain routes, tunnels, rush hours.
- Directs Fire Chief to post signs and send written notices to affected parties.
- Establishes requirements for reporting accidents, liability and penalties.
- Exceptions for rail shipments: leaves most regulation to state-level agencies.
- Exceptions for truck shipments of radioactive materials: some restrictions not applicable; state may designate routes.

and to routing of hazardo wastes. It is meant to be a compr hensive framework for transport tion regulation, compatible wit though not a substitute for, "cor munity right-to-know" ord nances currently being enacted regulate storage and use of ha ardous substances.

The basic framework com from similar ordinances in lar cities, particularly Boston's, and designed for a densely populat city or county. Very stringent loc regulation of hazardous materia transportation has been enacted cities as divergent as Dallas-Fo Worth, Portland, Houston ar New York City. Denver is consi ering such an ordinance serious as a response to last year's accide involving a Navy torpedo truc Other cities where officials a considering similar ordinances i clude Columbus, Cincinnat Cambridge and Rochester.

This conservative model ord nance is designed to be self-finan ing. User fees should be adequa

to cover the proposed regulatory program. Is it compatible with federal law? Consistent with recent major U.S. court cases favorable to state and local regulation (American Trucking Association v. Larson, New Hampshire Motor Transport Association v. Flynn and the Ritter case upholding New York City's regulations)?

### Starting Priority Lists

One key innovation in the model ordinance is that it begins to provide an answer to the fire chiefs' frequently expressed dilemma: "How can I begin to regulate every cargo that Department of Transportation considers hazardous? That might be 30,000 or so!" No federal agency has provided a priority list of the most hazardous cargoes. Localities and states simply have to make a start (as Denver has) using their own best judgment.

As recently as February, New Jersey's Department of Environmental Protection used four criteria to designate six ultrahazardous chemicals used in 25 plants which the state will inspect immediately and regulate more stringently. The model ordinance provides a beginning "short list" of hazardous materials presenting highest risks and subject to additional regulations, and authorizes the fire chief to add or subtract cargoes from that list.

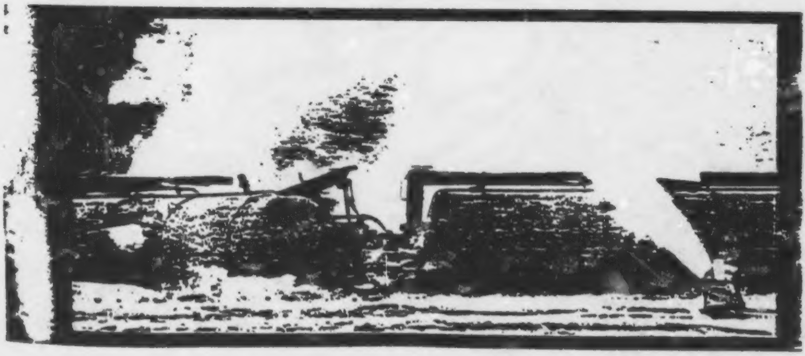
### Fire Chiefs Can Demand Information

Another important innovation in the model ordinance is that the fire chief is directed to request considerable information from railroads that might be using the city or county as a corridor for hazardous cargoes. This would include learning whether the railroads use state-of-the-art methods to choose safe routes and avoid railyards with the worst safety records.

This provision is modeled after tough Oregon State Public Utility Commission regulations. The Oregon rule is actually tougher, requiring the railroads to provide a great deal of emergency response information. The Federal Rail Safety Act of 1970 was enacted explicitly to encourage states to do more to regulate rail safety. But cities and counties could play a vigorous role in gathering information about potential local safety hazards. They then could seek state remedy of the problem or local public pressure might force a remedy.

To obtain a copy of the full text of the model local ordinance, contact *Fred Millar, Ph.D., Environmental Policy Institute, 218 D Street S.E., Washington, D.C. 20003, (202) 544-2600.*

***Fred Millar, Ph.D.**, is director of the Nuclear and Hazardous Materials Project of the Environmental Policy Institute. He has appeared at national fire conferences and on network television, and has published in safety and mass media publications.*



# TESTIMONY

# BY

# THE HONORABLE STEWART B. McKINNEY

Mr. Chairman, and distinguished members of the Subcommittee, in January of 1981, The U.S. Department of Transportation (DOT) issued a final rule on highway routing of radioactive materials. This rule is commonly referred to by its docket number, HM-164. The principle purpose of HM-164 is to establish nationally applicable standards for the safe highway routing of radioactive materials.

DOT has devoted several years to developing HM-164 and defending various challenges to its validity. To date, no evidence has been presented which rebuts the Department's conclusion that, when federal rules are complied with, spent nuclear fuel can be transported over interstate highway, and other comparable routes, with a confident level of safety.

The transportation and disposal of spent nuclear fuel is a problem facing the nation as a whole, requiring cooperation in assuming a fare share of responsibility. The Hazardous Materials Transportation Act and HM-164 have played a major role in ensuring that spent nuclear fuel is transported by the safest possible route.

This holds true in the specific case involving New York City's application for a nonpreemption determination to ban the shipment of spent nuclear fuel through New York City.

Upon applying for nonpreemption, New York submitted a report comparing the merits of five alternative routes to the route originally selected by the Department of transportation, four of which traverse the State of Connecticut. I outlined my arguments for denial of New York City's application in a letter dated January 23, 1985, to the Materials Transportation Bureau of the U.S. Department of Transportation, and have enclosed that letter as part of my testimony today.

DOT has allowed for the required comment period on the City of New York's application and all parties concerned have had an opportunity to submit their statements. Accordingly, DOT is expected to make its determination in early September. This determination will set precedent for the many other jurisdictions who already have bans and restrictions on the transport of nuclear material. If New York City's application is granted, the effect will be to encourage many other states and localities to pursue a similar course.

I am opposed to the setting of this precedent because it goes against the grain of cooperation and violates the concept of sharing respnsibility.

Mr. Chairman, I thank you for giving me the opportunity to share my thoughts on this matter with your committee.

STEWART B. MCKINNEY
4TH DISTRICT, CONNECTICUT

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NORWALK, CONNECTICUT
TELEPHONE: (203) [illegible]

January 23, 1985

Mr. Alan I. Roberts
Associate Director for
Hazardous Waste Regulation
Dockets Branch, Materials
Transportation Bureau, Room 8428
400 Seventh Stree, SW
Washington, D.C. 20590
Attn. Dockets Branch [ NPDA-2 ]

Dear Mr. Roberts:

This letter is in response to the application filed by the City of New York with the Materials Transportation Bureau dated, December 23, 1984. The application seeks a nonpreemption determination of Section 175.111(1) of the Health Code of the City of New York pursuant to the provisions of 49 CFR 107.215-107.225.. for the purpose of preventing the transport of spent nuclear fuel from the Brookhaven National Laboratory through a route which traverses New York City.

In addition to the application of December 23, 1984, the City of New York submitted to the Materials Transportation Bureau a report prepared by Arthur D. Little, Inc., entitled, "Irradiated Fuel Shipping Alternatives Through or Around New York City." Upon review of this report, I believe the application should be rejected. Let me explain.

The report compares the merits of five alternative routes, four of which traverse the State of Connecticut, to the route originally selected by the Department of Transportation. This comparison indicates that the alternative routes would be far more costly, yet would reduce the chances of an accident.

However, the report does not draw any conclusions as to whether the results of the report support a nonpreemption determination, nor does it recommend a more efficient route for transport of spent nuclear fuel from the Brookhaven National Laboratory. I believe the firm of Arthur D. Little would have drawn a conclusion and recommended an alternative route had they felt one of the five alternative routes better met the criteria for transporting spent nuclear fuel than the route used prior to 1976.

Further analysis of the Little report reveals other arguments for application denial.

First, the cost of transporting the spent nuclear fuel by the alternative routes in Connecticut would exceed the cost of the direct highway route through New York City. In 1985 alone the increase in cost would be anywhere between $3,000 and $499,000. It should be noted that after 1986 the number of shipments will decrease by approximately two thirds, and thus eliminate the cost reduction achieved by operating a large number of individual shipments per year.

Second, the report indicates that the alternative routes are longer, circuitous, entail passage over waterways and the unloading and loading of the fuel on barges. One would tend to believe that these factors would increase the potential for an accident, the opportunity for illegal tampering and, in reference to waterway passage, complicate the emergency response in the case of a hazardous materials transportation accident.

Third, the Little report ignores other possible alternative transit modes such as use of air or rail transport.

Finally, the City of New York believes a circuitous route through the State of Connecticut would eliminate the risk of a possible accident in an urban area. I can understand this concern, however, the alternative routes pass directly through the city centers of Hartford, Bridgeport, Waterbury and New London. There is little to be gained by substituting one set of urban centers for another over a far more indirect route.

It is not my intention to further delay the shipment of these materials from the Brookhaven facility. I do not believe, however, that the citizens of Connecticut should be exposed to the transportation of spent nuclear fuels when a more direct, less costly, and potentially safer route exists through the City of New York.

Sincerely,

Stewart B McKinney

Stewart B. McKinney M.C.

SBM/rc

"I herby certify that two copies of this comment regarding docket no. HPDA-2 have been sent to Mr. Barry Schwartz at the following address:

Office of the Law Department, City of
New York, 100 Church Street, 6th
Floor, New York, N.Y. 10007

NYPIRG
**NEW YORK PUBLIC INTEREST RESEARCH GROUP, INC.**
9 Murray Street • N.Y., N.Y. 10007 • (212) 349-6460
Offices in: Albany Binghamton Buffalo Cortland Fredonia Long Island New Paltz New York City Syracuse

## Statement of John J. McCaffrey Jr. on behalf of the New York Public Interest Research Group, Inc Submitted to the Commerce, Transportation and Tourism Subcommittee of the House Committee on Energy and Commerce

August 1, 1985

The New York Public Interest Research Group, Inc.(NYPIRG) appreciates this opportunity to submit this testimony for the subcommittee hearing record concerning the critical issue of nuclear waste transportation. NYPIRG is New York's largest state-wide, nonprofit research and advocacy organization. We work on a number of national consumer and environmental issues such as the Superfund, reform of the Price-Anderson Nuclear Insurance Act and adequate financial aid for college students.

In the area of nuclear safety, NYPIRG has conducted extensive studies on the lack of emergency preparedness at Indian Point, as well as a study of the inadequacy of emergency planning along nuclear waste transportation routes in central New York. We have also researched and lobbied many other nuclear waste and nuclear regulations, and we have been a party in adminstrative process before the Nuclear Regulatory Commission.

NYPIRG applauds the efforts of Congressmen Mario Biaggi, Ted Weiss, and Bill Green for authoring legislation to deal with the problem of transportation of nuclear waste across New York state. We also commend the efforts of Subcommittee Chairperson James Florio and the other members of this subcommittee for conducting this first congressional hearing to deal with the transportation of high-level nuclear waste. Also the efforts of Congressmen James Scheuer and Thomas Manton, other members of the New York congressional delegation and Queens Borough President Donald Manes must be noted for their work.

As all of us are aware, nuclear waste remains radioactive, for hundreds, if not thousands, of years. NYPIRG believes that the only real solution to the radioactive waste dilemma is to reduce or eliminate the amount of waste generated.

Yet the reality of several decades of nuclear technology is that radioactive waste is being stockpiled at reactors and other federal nuclear facilities, and must be moved to other storage or disposal facilities. With the continued generation of more and more nuclear waste, and with the development of the nation's high-level waste repository, we can expect a dramatic increase of shipments in the future.

McCaffrey testimony-continued

NYPIRG believes the Hazardous Materials Transportation Act of 1974 should be amended to allow a locality to take whatever measures its officials deem necessary to protect the welfare of its citizens. Because state and local officials are best qualified to evaluate which measures are necessary to protect the public's health, prenotification of these officials should be mandatory.

NYPIRG's view is that the federal government should provide assistance to local law enforcement officers, firefighters, and others responsible for handling highway incidents involving radioactive materials. Because state and local officials are the first to respond to emergencies, the federal Department of Transportation and other federal agencies should provide for training, proper equipment and the development of adequate emergency response procedures.

We believe no more shipments should be moved from Brookhaven National Laboratories until several issues have been addressed:

1. All alternative transportation routes are throughly analyzed and evaluated-including barging waste to South Carolina.
2. Shipping casks can be fully tested and proven safe.
3. An adequate emergency plan can be developed and proven workable all along whatever route is chosen.

This year's shipments from Brookhaven have freed-up more than two years of storage space and therefore we believe there is absolutely no reason why shipments should resume until these grave safety matters are more carefully examined.

The problem of transporting radioactive waste is an exceedingly difficult one and will not go away in our lifetime. NYPIRG has long been concerned with the problems of emergency planning for accidents involving radioactive material; our research has led us to conclude that it is imperative that detailed emergency planning regulations be developed and implemented for the shipment of radioactive waste.

The people of New York and Connecticut deserve better protection from the risks of nuclear accidents. We urge Congress to take immediate steps to enact legislation that would assure the safety of people living near nuclear transportation routes.

Thank you again for this opportunity to speak before such a distinguished panel. I hope all of us together can stop this grave threat to ourselves as well as future generations.

THE CITY OF NEW YORK
OFFICE OF THE COMPTROLLER

HARRISON J. GOLDIN
COMPTROLLER

July 18, 1985

Congressman James Florio
Chairman, Subcommittee on Commerce,
  Transportation and Tourism
Washington, D.C.

Dear Congressman Florio:

In connection with your hearing on July 16, 1985 respecting the transport of radioactive waste from Brookhaven National Laboratory, I would appreciate the insertion of the following in the public record.

> For nearly a decade I have opposed the shipment of radioactive materials through the City. I addressed this issue in audits as far back as 1976 and 1977.
>
> I am incredulous that the Federal government is imposing its authority to overrule by fiat this City's ordinance banning the transportation of nuclear wastes through its borders, without providing even minimum safety protections. This approach - act now, worry about the consequences later -- seems endemic to the way the Federal government now regulates. It is a perilous, irresponsible approach.
>
> Playing roulette with nuclear waste on the treacherous highways of this, the most populous city in the country, is nothing short of an abdication by the Federal government of its most basic responsibility, to provide for the safety and security of the American people.
>
> The City faces, at the very least, a 25 to 30 shipment backlog of radioactive

waste from Brookhaven Laboratories. If and when the Long Island Lighting Company's Shoreham nuclear reactor comes on line, additional shipments can also be anticipated.

The United States Court of Appeal's decision allowing shipment of these wastes through the City was on a procedural point; the court upheld the U.S. Department of Transportation's right to dictate policy for the shipment of nuclear wastes on interstate highways.

While I do not presume to know all the answers to the troublesome issues involved in this matter, there are numerous critical questions for which, shockingly, it appears nobody has the answers.

Congress should enact a moratorium on the shipment of radioactive materials through New York City until these questions are answered satisfactorily. At least six matters of consequence need to be resolved.

First, as to the casks in which the nuclear wastes will be transported, existing safety standards are woefully inadequate. There is a serious question as to their capacity to withstand drops, punctures and extreme temperatures. For example, under existing specifications the casks are required to withstand only a thirty foot drop. That is an insufficient margin of safety for many of the bridges along proposed routes through New York City.

There are other concerns, too. For example, temperature tolerance requirements appear to be far below the extreme temperatures characteristic in highway accidents; the cask walls may be subject to embrittlement and cracking in a sharp impact.

While these casks are billed as indestructable by the nuclear industry, there is evidence that safety tests have been flawed. The Sierra Club reports that no casks used by the industry today have actually been subject to full-scale Nuclear Regulatory Commission (NRC) testing requirements. Only scale model or computer simulation tests have been conducted.

Moreover, the casks that Brookhaven Laboratory proposes to utilize have been in storage since 1976; to our knowledge they have never undergone even the structural testing to which I just referred. If testing has occurred, we ought to be privy to the results. And if testing has not taken place, it should be immediately. If the casks are considered obsolete, their use must be disallowed.

Second, an emergency preparedness plan to provide for a timely, coordinated response by local, State and Federal authorities, should an accident occur, must be in place.

Third, the City has no assurance that trained State and Federal personnel would be available to assist in the event of an incident. An accident involving nuclear wastes on our highways would have extraordinary implications, with possible consequences beyond the experience of nearly all emergency personnel. Is it New York City's responsibility to provide trained personnel? If so, who is going to pay the bill?

Fourth, should an accident occur, and a cask be breached, who is responsible for the clean up and who will pay its costs? The Price-Anderson Act provides insurance coverage for such incidents; but how quickly will the City recover its clean up expenses? Will all the costs be recoverable? And is it the City that would be responsible for "making the case" for cost recovery?

Fifth, there is the matter of terrorism. We have seen how far terrorists will go to wreak destruction and death upon selected targets. The proposed plan, providing one State trooper escort in front of each nuclear waste truck and one behind, would do little to fend off determined kamikazi terrorists. This phenomenon ups the ante for assuring the security of these nuclear shipments. In past months we have seen baricades erected in front of Federal buildings even in this City. We have witnessed two bombings of Union Carbide buildings in this area; and let us not forget the violence in Rockland County just a few years ago. The security of nuclear waste shipments has not been adequately addressed. And that is inexcusable.

Sixth, the Federal government has refused to consider viable alternatives to shipping radioactive materials through New York City. Therefore, the City itself ordered a study of the risks associated with proposed alternative shipping routes. According to this Arthur D. Little study, completed in December, 1984, there are at least two shipping alternatives that would involve a lesser risk than trucking through the City, at most for a reasonable premium.

Questions about the integrity of containers which carry nuclear wastes, adequate contingency planning in the event of an accident, who will bear the responsibility and cost of a clean up, the availability of safer alternative routes circumventing the City, insurance in the event of an accident and safeguards against terrorism must be answered satisfactorily.

In short, we are not being obstructionists or fanciful; the questions are serious and demand adequate answers. The Department of Transportation's existing regulations governing the transport of nuclear wastes may be sufficient for driving down the highways of Kansas; they are wholly inadequate for this, the nation's most populous city, where the roads often seem no better than the Ho Chi Minh trail.

Congressman Weiss' bill to provide state and local governments the authority to meet their unique emergency obligations deserves serious consideration by the Congress.

In 1976 New York City acted properly to protect its citizens by banning the transport of radioactive materials within municipal limits. Backed by the courts, the Federal government overrode our ordinance. Now, without adequate precautions in place, shipments have begun, placing the lives of our citizens at risk. A moratorium to stop these shipments should be implemented now.

I urge your Subcommittee to provide local governments the prerogative to exercise flexibility and judgment in situations, as in New York City, that involve dense populations. In the meantime, a moritorium should be enacted to stop the shipment of radioactive materials through New York City. Thank you.

Sincerely,

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES
Carroll D. Besadny
Secretary

BOX 7921
MADISON, WISCONSIN 53707

July 30, 1985

The Honorable James Florio, Chairman
Subcommittee on Commerce Transportation
and Tourism

Dear Congressman Florio:

Thank you for the opportunity to submit comments on the issue of transportation of radioactive materials. I have been requested to address the routing aspect of radioactive shipments. The transportation issue cannot be separated into simple separate segments but must be viewed in its entirety. My Department has identified five major variables or considerations to be used in assessing a state's or region's transportation system: regulation, shipments, liability, cask design, and physical factors. Although the five variables are interrelated the first step in a transportation safety analysis is assessing a regulatory scheme which is uniform and acceptable to the states. If the federal government is to expect the states to endorse their actions there must be an open, on-going dialogue with the states, local governments, and Indian tribes to address various public health and environmental concerns. Currently the approach used is dictatorial rather than participatory.

My Department is concerned with the transportation of radioactive materials because Wisconsin is a major nuclear state. Four commercial power reactors are located in Wisconsin, and four more are located along the state's borders with Minnesota and Illinois. The state is a major corridor for both truck and rail shipments. Since July of 1983 there have been more than 220 truck shipments of spent fuel through southeastern Wisconsin, an area with more than 1.5 million residents. The western side of the state, 230 miles along the Mississippi River, is a major corridor for commercial spent fuel shipments to and from other states. More than 100,000 people live within a few miles of the rail route currently being used for one of the largest commercial spent fuel shipping campaigns in the history of the industry, and the same route may be heavily used in the future for shipments to and from a Monitored Retrievable Storage (MRS) facility, and to one or two geologic repositories. This route traverses a particularly environmentally sensitive area of the state. Almost 85% of this route goes through wetlands, crosses major rivers, or is within 100 feet of the Mississippi River. Because of both the environmental and health concerns, a responsible method of transporting radioactive materials must be utilized. An assessment of alternative routes as well as modes must be made by the shipper prior to NRC approving of a route. Although NRC is responsible for such an approval, DOT has a responsibility in enforcing the federal transportation regulations. Therefore, a joint NRC/DOT assessment in consultation with the shipper and the state or tribe should be conducted to determine both the need for the shipment and the mode and route that the shipment will take.

A determination of need and the submittal of an Environmental Impact Statement is necessary in selecting a site for a nuclear power generating facility. Yet when the highly radioactive waste material from the reactor is transported, neither is required. Such a gap in regulations and the federal government's unwillingness to address such issues is environmentally irresponsible and unsound in a risk management perspective. A nuclear power plant must have an emergency response plan developed and coordinated with state and local authorities, which is to be periodically exercised. There is no such requirement for shippers to develop and exercise similar types of plans. DOT estimates that four billion tons of hazardous materials are transported yearly in the United States. Although the probability may be low, the consequences of an incident involving radioactive material by itself, or with other hazardous materials necessitates strong enforcement of more stringent regulations.

Several NRC studies have concluded that damages due to a severe transportation accident could be extensive. The NRC's final environmental statement on transportation of radioactive materials (NUREG-0170), published in 1977, estimated damages at $400 million in an urban area, and up to $10 million in a rural area, following a severe accident. Another NRC study (NUREG-0743) concluded the damages in an urban area could exceed $2 billion following a "worst case" transportation incident. Such an incident would also include immediate health affects and hundreds of cases of latent cancer. There has been no real estimation of the amount and kind of damage that will be sustained to the environment. Given these conditions NRC and DOT must be more sensitive to concerns that local governments have and to assist them in developing a comprehensive regulatory scheme that would enhance the safety of radioactive waste transportation. I encourage Congress to enact the following risk management measures:

1. Any nuclear facility proposing to ship spent nuclear fuel or high-level radioactive waste off-site must first receive specific approval from the NRC for the proposed shipment(s), proposed route(s), and the proposed mode(s).

2. Prior to approving a request for approval to ship spent fuel or high-level radioactive waste off-site, the NRC must:

   a. Determine that there is a need for the proposed shipments, applying the same criteria which the NRC has already adopted for determination of need for access to Federal Interim Storage facilities;

   b. Prepare an environmental assessment, in consultation with the affected states and tribes and the shipper, of the proposed route(s) of the shipments; and

   c. Receive an approved emergency response plan prepared by the shipper in consultation with affected state, local, and tribal officials, for potential transportation incidents along the proposed route(s) and such plans will be periodically exercised.

I have stated earlier that there are many aspects which must be included in the transportation of radioactive material. Although this committee has limited its scope to the regulatory scheme, I encourage you to address the realm of the whole issue. I have included a report that my staff has done on transportation considerations to be made in the siting of a high-level radioactive waste repository. My Department and the State are extremely interested in this issue and welcome further discussion which we hope will lead to the enhancement of safety both to the public and to the environment.

CD Besadny

C. D. Besadny, Secretary
Department of Natural Resources

7-30-85
Date

CDB:DW:mm

# An Analysis of What Considerations Should Be Made in the Transportation of High Level Radioactive Waste on a Regional Basis

The purpose of this report is to identify key factors which should be considered in the transportation of high level radioactive waste. The variables or considerations which are used in identifying these factors does not limit the addition of other variables. Updating of what factors are or should be considered must be conducted periodically. The reference to the use of a form of fault tree in identifying these factors does not mean that the analysis should be interpreted as a mathematical computation. Computation of how risks themselves are assessed is a continuing element in the development of a risk assessment. The analysis is a method of what factors are to be considered while an assessment is the computation or value of the factors.

A common misconception is that an analysis is the same as an assessment. A complete analysis should include the assessment of what the factors are after having been identified. The assessment is the incorporation of risk estimation and risk evaluation. Risk estimation is the statistical and/or analytical modeling process leading to a quantitative estimate of a given risk. Risk evaluation is the appraisal of the significance of a given quantitative measure of risk.[1] Any method of identifying what factors should be considered in an assessment is valid. However, once the factors are identified there are varying methods of performing an assessment.

There are four basic methodologies of risk estimation: statistical reference, fault tree modeling, analytical simulation modeling, and subjective estimation of work parameters.[2]

Once an analysis of what factors are to be identified has been completed, an assessment of these factors should be conducted. This report attempts to identify the factors involved in the transportation of radioactive waste and how it relates to the Draft Regional Characterization Report by the Office of Crystalline Repository Development (OCRD).

The Draft Regional Characterization Report of May 1983, did not adequately address the section on transportation systems. Although it does depict what the major highways, rail lines and ports are, it does not take into consideration the road or track conditions nor factor in the abandonment of various rail lines. The report infers that stating the various mode conditions as "good, fair or poor" is a sufficient assessment of a state's or region's transportation systems. Without an explanation of what these conditions mean and how they were derived, the terms are meaningless. An analysis of the transportation modes should be conducted and applied to all the regional reports.

Such an analysis could be a significant tool in determining a region's acceptability for repository siting. The transportation infrastructure in one region may be conceptually safer than in another region, and when all other variables in the selection process are the same, the transportation systems could be an important deciding factor. An acceptable methodology or model should be implemented to analyze the transportation infrastructure in all the regions undergoing environmental characterization. Each phase of the siting process must include an analysis of the transportation systems. An analysis based on a conceptual model will be more detailed in the site specific phase than in the region phase.

A preliminary conceptual model for use in assessing a region's transportation systems should entail variables or considerations that all the regions would use in a comprehensive fashion. Five variables which should be included in such a model are: regulations, shipments, liability, cask design, and physical factors. A form of a fault tree is used in Appendix A to illustrate the factors. Each variable is subdivided by factors. Some factors are subdivided by factors. Each variable includes a set of factors which contribute to the variable and must be considered when analyzing all transportation modes. Each mode must have a similar methodology which should be used in relation to the regional characterization reports.

## REGULATORY

One of the major variables in the transportation model involves regulations. Some local municipalities and counties have expressed concern with radioactive waste shipments by passing ordinances which place a ban on such shipments. Such bans may not be able to stand up in court. Such an ordinance made by the City of New York was decided upon in Federal District Court and upheld in the United States Supreme Court[3]. Such opposition against high level radioactive waste shipments is due to the desire of local and state governments to have such shipments routed around large metropolitan areas or areas with dense populations. Several states have a concern that the current regulations on transportation of radioactive waste are not stringent enough. The Code of Federal Regulations Title-49 as set out in a Federal Department of Transportation document known as HM-164 specifies that if a state or community wishes that alternative routes be used, then a risk analysis be used to demonstrate that a specific alternative route be designated by the state or community[4].

The federal DOT has determined that highway shipments of waste are the safest when using the interstate highway system[5]. Many interstate systems traverse large population centers because they were originally intended to connect points of commerce rather than transport radioactive wastes. Appendix A of HM-164 preempts any state or local regulation which may interfere with interstate commerce or is inconsistent with the federal regulations. It does not preclude a state from developing an analysis which can be used to designate alternative routes[6]. The designation of an alternative route assumes that DOT will accept the designation. Such an analysis and alternative route selection must be able to withstand scrutiny in court if DOT does not accept the alternative route designation. The designation of a safe route for transporting high level radioactive wastes includes many factors which will be discussed in further detail in the shipment section.

When characterizing the transportation systems in the regional report, attention should be given to the enforcement of regulations which involve waste transport. Statistically, the number of shipments through a given region will be low in comparison to the total number of shipments involving all hazardous materials. The USDOT estimates that four billion tons of hazardous materials are transported yearly in the United States[7]. Although the probability may be low, the consequences of an incident involving radioactive material by itself, or with other hazardous materials, necessitates the need for strong enforcement. States have an average of two federal inspectors which are to enforce or inspect shipments of hazardous materials which includes radioactive materials. Such a small force can cause one to question the capability and effectiveness of the regulatory scheme.

The question of regulations involving radioactive materials not only concerns route selection but also concerns the enforcement of cask design and emission standards. The standards may be met, but there is disagreement on whether this guarantees the integrity of the casks themselves. An acceptable analysis would include a multiplicative risk model to determine the radiological impacts that emissions from the casks would have on humans and the environment when a shipment passes through or stops in an area or if the cask develops a leak due to an incident or a system failure.

The Nuclear Regulatory Commission is responsible for inspecting cask design and integrity; however, not all the casks are inspected every time. The possibility of a system failure can, therefore, be increased due to the lack of constant enforcement and inspection. The Nuclear Regulatory Commission is also responsible for the enforcement of the prenotification procedures to states through which high level waste or spent fuel rods will be traversing. Code of Federal Regulations Title 10 Part 73 state that the Governor or the designee of the Governor shall be notified of the amount of waste and the route that will be taken when transporting such wastes[8]. If the Governor chooses further prenotification of such shipments, that office or designee may notify law enforcement personnel or emergency responders or public officials as long as such personnel conform to the safeguards of information section of CFR 10 Part 73.

The regulations involving the transportation of radioactive waste and the capability of enforcing such regulations must be considered in characterizing a region's transportation systems. The determination of what types of systems exist does not address the inadequacy of regulatory enforcement. Due to the recent Supreme Court decision, regulation variable is one constant that all the regions will have in common, and must be assessed in the regional characterizations.

## SHIPMENTS

The shipment variable may be the most complex of all the considerations in that it entails factors or conditions which may also serve as variables. When a region assesses the shipment of high level radioactive waste for all modes, consideration of several factors should be made. These considerations include: accident rate, population density, incident harm, emergency response, topography, meteorology, and condition of the mode.

The accident rate is based on several factors. One factor is the number of shipments or projected shipments of waste which either will be passing through a region or coming into a region. The number of shipments is contingent upon the type of facility that will be used: repository, monitored retrievable storage (MRS), or reprocessing plant. The volume of waste and the type of facility does have a direct relation to the accident rate. The more shipments of waste, the higher the possibility for an accident to occur. Considerations should be given to comparable types of hazardous materials shipments in which an incident occurs. Although the current accident rate involving radioactive and hazardous materials shipments is low, the potential of an incident does exist.

A statistical model should be developed to factor in the possibility of an incident involving radioactive materials. It is important to factor in the number of hazardous materials transportation incidents. In a worst case scenario, a radioactive waste shipment could be involved in an incident which also has a hazardous material release. Although the probability of such an incident may be statistically low it may indicate that special shipments by rail, which do not include other hazardous materials, have a higher probability of safety.

The accident rate along a specific route segment may also indicate that the "probability of incident to occur" may be lower during certain hours within a 24-hour time span. A segment is the distance from node to node. A node is an intersection of a main arterial route. An analysis can be made by determining the number of accidents involved in all the transportation modes and comparing them with hazardous materials shipments similar in weight to radioactive shipments. Another factor to consider is the number of accidents in which shipments were involved and in which there was a release of the substance being transported. The release of substance will also be affected by the type of package that is used in transporting such material. The cask design for high level waste is considered to be one of the major factors of the transportation systems and will be addressed later.

The accident rate in relation to the average daily traffic of all transportation, specifically radioactive shipments, can be applied to segments such as certain highway or rail mileages or a certain distance that shipments are transported by water. Sandia Laboratory and other DOE contractors have conducted general analysis of risks of transporting radioactive materials[7], but more detail must be given to these factors to adequately assess whether a certain region's transportation system is of a higher quality than another region's. Existence of various federal interstate systems and class I rail lines does not always mean that the accident rate will be lower than an alternative line or that the accident rate in one region will be similar to another region's for all or any transportation modes.

Another factor to be considered under shipments of radioactive materials is the number of population centers that such shipments will be entering. Although shipments will pass through population centers, attempts should be made to route around densely populated areas. The definition of a "densely populated area" has not been clearly defined or accepted by either the federal government or by some state and local governments. Therefore, if shipments are to be made, they should be made on the segments which have the lowest accident rate and in the areas with the lowest population density. Statistically, the accident rate may be low for radioactive shipments; however, a certain amount of exposure will be received by people who live in areas where shipments occur. If an accident does cause a release of radioactive materials, it would cause a radiation health problem of a higher magnitude in an area which has more people that can be exposed.

The consequences of a shipment involved in an accident in which radioactive materials are released can be complex. The materials that are released due to an accident can be either nondispersible and cause exposure due to shielding failure, or dispersible. Dispersible materials can leak into the ground and cause exposure known as groundshine. Emissions can also be by a passing cloud (cloudshine). Inhalation is another example of how dispersible materials can expose a person to radiation.

The risk of exposure from a transportation incident would affect population, environment, and property. The dosage that a person receives from a release of an incident is.contingent upon the time a person was exposed, the distance from which the incident occurred and the shielding that the person had at the time of exposure. Further analysis must be made to determine the effects that the type of exposures will have on the population.

The environmental impacts of a radioactive release must also be further developed or assessed in determining the route or method of shipping such wastes. A release of such material could have a long-term impact on the environment by affecting the air and water quality, wildlife and vegetation of a given area or by having a negative impact of the geology and hydrology of an area. The radiation release could enter the food chain by any one or all of those variables. The impact that a repository itself would have upon the hydrogeology is not agreed upon much less what the impacts would be if a release occurred and the soil was affected. The migration rate of the groundwater may affect the rate of exposure. It is difficult to take preventative measures to stop such migration due to the fact that such an incident would be an accidental release. The condition of the air and water quality and hydrogeology does have an effect on the environment, and the harm that would be caused by an incident should be a major consideration of how and where radioactive shipments will be made. A repository failure might be more catastrophic, but such a failure can be more readily prepared for due to long lead times. A transportation incident is more difficult to deal with because of the unknown nature of exactly where such an incident could or would occur and the short lead time for a response.

The third factor to be considered in assessing the harm that release during shipment will have on an area is the property or socioeconomic concern. The release of material may contaminate an area and cause damage to property which would have an adverse effect on social and economic well-being of a community or area in which an incident took place. The considerations to be made for this factor are what the impacts are of a release on agricultural areas, residential districts, tourist areas, and business districts.

A fourth consequence involved in shipments is the emergency response capability. Each segment of the shipping routes must have an emergency response mechanism by which a community can be protected in the event of an accidental or intentional release of radioactive materials. An assessment must be made of the capability of emergency response measures or capabilities along the segments of highway and rail and the ports which were identified in the characterization report.

An assessment of the planning and training capability of the federal, state and local governments must be made to determine the effectiveness of these entities to respond to a radioactive release. Not all communities, counties or states will be as involved in the transportation issue; however, more detailed plans are needed on how to tactically respond to a release. Currently general guidelines are available, but specific procedures need to be refined to assure the emergency response capability of a community, county or state. Since the local emergency responders are the first on scene it's important that all states assess the planning and equipment capability of such units.

The federal government must assist the states financially and provide technical input in developing contingency planning. Such planning should include the procedures that a local responder can take given the type of equipment that is available. The Nuclear Regulatory Commission has developed "An Overview of Critical Elements in a Model State System for Emergency Response to Radiological Transportation Incidents," NUREG/CR2225[9]. The planning guide should include what responsibilities each entity has in emergency response. The planning must include training of personnel with the various types of equipment. The more sophisticated the equipment the more sophisticated the training. The type of equipment to be used is outlined in the NUREG document. Such equipment should include communication, meteorological and radiological instrumentation. Other types of equipment needed include field survey instrumentation, air samplers, basic laboratory supplies and equipment as well as a basic decontamination kit. This type of equipment should be made available by the federal and/or state government.

Such sophisticated equipment should be handled by specially trained emergency response personnel who have a working knowledge of radioactive materials. Although such equipment and trained personnel may be available, the capability to handle a release is contingent upon the time necessary for such personnel to respond to a release after being notified that such an incident has occurred. In addition to the equipment, a response vehicle must be included to transport emergency response personnel who will be responsible for mitigation and will support the local emergency responders, such as fire and law enforcement personnel. The capability of hospitals to provide technical assistance including trained personnel and facilities must also be assessed and deficiencies should be rectified.

State and local governments should be prepared by training and planning. Such measures should be assessed by the federal government and will continually be assessed and updated by the agencies involved. When transporting waste through a region or to a region, the emergency response capability of the states within the region as well as the local communities must be determined. The time and distance that a shipment is being transported affects the potential for an incident to occur. Therefore, the capability of emergency responders is crucial in mitigation techniques.

The responsibility for emergency response measures also includes the utilities and shippers who must provide trained personnel to assist in the event of an incident which may take place at a facility and may pose a threat to the population and environment off the site of the facility. The facility operator must provide technical support and trained personnel in the event of a release at a nuclear power reactor facility, and a coordinated planned approach must be developed so that the utilities or plant operators, federal personnel, state personnel and local personnel may have an effective response. States do have plans for nuclear power plant incidents but are financially unable to expend the training and equipment capability to areas through which spent fuel is currently being shipped. The federal government in cooperation with state and local governments should assess emergency response capabilities and provide the overall planning approach. The capabilities must be factored in the regional characterization. One region may be better prepared than another and should be a major consideration in shipment of radioactive materials.

The topography of a region affects the accident rate of radioactive shipments. A particular region may have Class I rail lines or interstate highways, but the potential for incidents to occur increases depending on the type of topography. The topography as well as the meteorology of a region are consequences to be considered in the physical fault but do have a direct impact on the shipment's fault.

The condition of a rail segment or highway segment must be included in the shipment's fault. A rail line that has different pound limits per foot of track can affect the speed at which a shipment can be made. The percentage of rail that is 60 to 100 pounds is higher in the areas of the north central region that have geological rock formations being assessed for repository siting. Other areas within the same region that may not have desirable rock formations have a higher percentage of rail above 100 pounds. Therefore, the characterization that Class I rail lines in a region guarantees adequate rail service for shipments is inadequate. The type of rail (pounds per rail foot) and the track condition must be assessed in determining the safety of a region's transportation systems.

Conditions of highway segments must also be considered. Lack of federal highway funds, weather conditions and the use of doublebottom trucks will put continual stress on the highway system. Additional shipments of high level waste and spent fuel rods will accelerate the deterioration rate of the highway system. If a region receives a facility or if reprocessing were conducted or if an MRS facility were located within a region, the stress on both the highway and rail system will be a greater factor than if a region was to serve as a bridge to a facility. A state serves as a bridge when shipments pass through from an origin outside the state to destinations in other states.

Coastal zone impacts must also be considered in the event of barge shipments of waste. The capability of ports to handle increased traffic due to radioactive waste shipments should be assessed. Conditions of ports and potential environmental impacts that may occur to a region have not been adequately addressed and should be further investigated in a region's characterization of its transportation systems.

An analysis of the procedures involved in shipping of radioactive materials or wastes must be conducted to determine the safety of shipping wastes to or through a region.

## LIABILITY

The third variable in the transportation systems analysis is liability. The regional characterization report does not address the issue, and it would not apply to the model. However, liability is a major consideration when dealing with the transportation of radioactive waste. If a shipment of radioactive waste is involved in an "incident," the Price-Anderson federal nuclear insurance puts a ceiling of $570 million for facilities indemnified by the Nuclear Regulatory Commission for third party public claims[10]. The limit for Department of Energy indemnified facilities is $500 million[11]. NUREG-0170 estimates that accidents may cause damage up to $400 million in urban areas and $1-10 million in rural areas[12]. Sabotage could increase the top level estimate. NUREG-0743 projects that damage to a highly populated urban area could be as high as $2 billion[13].

A nuclear incident has been defined in the Atomic Energy Act of 1954 as "any occurrence including an extraordinary nuclear occurrence, within the United States causing, within or outside the United States, bodily injury, sickness, disease or death, or loss of or damage to property, or loss of use of property, arising out of or resulting from the radioactive, toxic, explosive or other hazardous properties of source, special nuclear or byproduct material."[14] This means that if no radiation were released in an accident, then it would not be considered a nuclear incident. The Price-Anderson Act also limits the time of liability to 20 years from the time of the incident. Therefore, if any effects from the incident were experienced after 20 years (e.g., genetic effects or cancer), the "person" would not be able to receive funds from the coverage. Under the Atomic Energy Act of 1954, the definition of "persons" does include state and local governments. According to Price-Anderson, damage to off-site property would be reimbursed, but emergency services cost would not be reimbursed. The present limit of liability will increase an additional $5 million for every commercial reactor which is licensed[15]. The act does not include coverage of theft or sabotage if such action occurs after transportation or if transportation has been interrupted.

Large licensees will carry primary and secondary insurance which will pay claims for "bodily injury" and "property damage" arising out of the "nuclear energy hazard." The term "property damage" is defined as "physical injury to or destruction or radioactive contamination of property, and loss of use of property so injured, destroyed or contaminated, and loss of use of property while evacuated or withdrawn from use because property is contaminated or because of imminent danger of such contamination." This means if no radiation is released, coverage may be available if there was "imminent danger."[16]

## CASK DESIGN

Another variable which needs to be dealt with in assessing the transportation issue is the cask design. The cask design is a significant factor in relation to shipment fault considerations. The potential for an emission of radiation from a cask is increased when all the variables are factored in under the shipment fault.

The cask standards have been effective since 1967 and have not changed. The cask for fuel shipments is a cylindrical stainless steel mechanism that is surrounded by a gamma ray shield made of lead or uranium. An additional steel cylinder surrounds the shield. A borated solution is used between the outer steel and the lead. The test for casks are that they must withstand a 30-foot drop onto an unyielding surface and a puncture test of a free drop of over 40 inches onto a six-inch diameter steel peg. The cask must also be able to withstand a thermal exposure of 1475°F for 30 minutes and a three-foot water immersion for eight hours. The casks may not emit 1 millirem and above per hour of radiation at a distance of 3 feet[17]. The casks that are currently being used have not had tests performed on them to determine if they comply. The tests were conducted by mathematical calculations or by a computer model.

Although computer modeling can benefit in assessing the significance that one variable may have by itself or in combination with other variables, the casks themselves have not been tested. It is being assumed that the actual casks will be exactly like the prototype. Only testing of the casks can insure a high degree safety factor.

The casks are in limited number and may not be able to be used as needed. The estimated cost of cask rental has been quoted at $5,000. The casks vary in weight from 20 tons to 100 tons, and with the weight of the material plus the cask, an added stress will be put on the road or rail systems. This can accelerate deterioration of the transportation system and could have an effect on the accident rate. The existing cask design can be improved by insuring that they can withstand higher temperature fires for a longer time. In a worst case scenario, a cask or package containing a radioactive isotope which is water reactive could be involved in an accident with a truck or rail car carrying liquid petroleum gas (LPG). The tank cannot be moved and a fire is impinging on it. LPG burns at 3497°F, and one of the effective methods of control is to pump a minimum of 500 gallons of water per minute for a duration of two hours on the tank to cool it which would prevent a BLEVE (boiling liquid expanding vaporization explosion)[18]. The heat of the fire could exceed the time and heat limits of the cask. A leak of product could develop if that product were water reactive as well as radioactive, and thus, the risk and consequences of a release are greatly increased. According to HM-144 of CFR 49, pressurized gas tanks must be able to withstand a 1600° F fire for a 100-minute duration[19]. A minimum of test standards for containers that transport such pressurized gases as LPG should also be the minimum for radioactive waste cask standards. Tests should also be conducted for multiple or angular drops. A crush test should also be conducted. Such a test entails exertion of excessive amounts of pressure on the cask. A new design cask which meets these standards would lessen the risk of emission in the event of an accident.

The new casks which have undergone testing are the GNS-Castor-IC which is made of cast iron and the REA 20-23 cask which is made of stainless steel and lead. The castor is used in Europe and is considered the "state of the art"[20]. However, it has not been licensed by the NRC. The REA 20-23 has also been tested but not licensed[21]. These cask tests should be reviewed by state and federal experts to determine their acceptability. The issue of transportation has often centered on cask design and acceptability. A total review of such designs by state and federal personnel should be considered by the NRC. No matter what type of cask is used, radiation will be emitted and the NRC and DOE have stated that limited movements of radioactive shipments decreases the emissions and decreases the potential for transportation related accident.

## PHYSICAL

The physical factors are the fifth variable in the transportation considerations. Three factors to be considered are: topography, meteorology and human. The regional characterization report does not indicate how these three factors will impact the transportation of radioactive waste in a region. The topography of the transportation routes must be considered to determine the relative safety of shipments. Even if interstates are to be used for highway transportation, consideration must be given to arterial routes and the number and condition of bridges which are included in those routes. The number of bridges and their conditions are also important in assessing the rail routes. If the topography of a region is hilly and precipitates the continual increase and decrease of modal speed, a greater magnitude of risk is expected. An indepth analysis must be conducted to determine the risk of radioactive transport through areas or regions in which topography continually changes. The topography can have a direct relation to the accident rate of a highway or rail segment because it affects passing areas, line of sight distances and geometrics.

Meteorology can impact a transportation system in areas that have several months of sleet, snow and/or heavy rains which can increase the potential for an accident. The condition of the system deteriorates faster in regions which experience diverse climatic changes such as hot humid summers and cold wet winters. Regions which experience large amounts of snow could discourage transport during certain times of the year which would increase the density or amounts of shipments during other times of the year. Any increase of amounts or density of shipments will have an impact on the potential for an increase in the accident rate. Climatic changes will also have an effect of water transportation and may also necessitate seasonal transportation. The increased potential for an accident to occur due to meteorological conditions should be a consideration of a region's transportation systems.

Another consideration in the physical fault is the human impacts upon transportation. Accident rates are affected by driver error and should be considered in all variables involved in shipments and cask design. The human error also affects emergency response procedures either by lack of training or incorrect response measures. Human error due to negligence must be assessed in the modal accident rate as well. Human error in inspections of cask design may also affect the accident rate and increase the consequences of a harmful release of radiation. Another consideration in the human factor is the consequence of sabotage. Although it is difficult, the probability of an act of terrorism and the effects of such acts must be factored in, especially in the accident rate and the harmful effects due to a radiological or nonradiological accident. The physical fault should also account for the probability of incidents occurring such as barges exploding, planes colliding with a shipment of waste or an air collision with a nuclear facility such as a repository, MRS or reprocessing center. Such incidents may have a low probability but still should be considered as physical impacts on radioactive waste shipments.

The physical fault, especially the topography and meteorology of a region or area, should be an important factor in the characterization of the transportation systems. The human considerations would most likely be the same in each region undergoing consideration, but the topography and meteorology can be determining factors in the transportation systems of a region and can also be a factor in one region's desirability of repository selection over another region.

The five variables and their factors are variables that should be considered in a transportation analysis. There are other factors which may be considered as the site specific characterization is conducted, such as land use and value data, proximity of main rail lines and interstates to a potential repository and a specific transportation risk index from origin to destination. Neither the state nor the federal government has developed a detailed risk index by which an assessment of the suitability of the transportation systems can be made. A preliminary outline and multiplicative risk model is included in Appendix B. The risk model itself must undergo "modeling of certain aspects to be included in the development of a comprehensive evaluation of transportation systems.

The suggested methodology of how transportation systems should be analyzed is an approach to the direction the states should be taking in the regional characterization and in the other phases of the site selection process. It is clear that transportation is an important consideration in all the phases, yet very little has been done to assess the significance of the transportation systems and how they relate to the radioactive waste management question. This state should begin to conduct such analysis before it is overwhelmed with all the transportation aspects and essentially be reactive rather than innovative in its approach to radioactive waste management.

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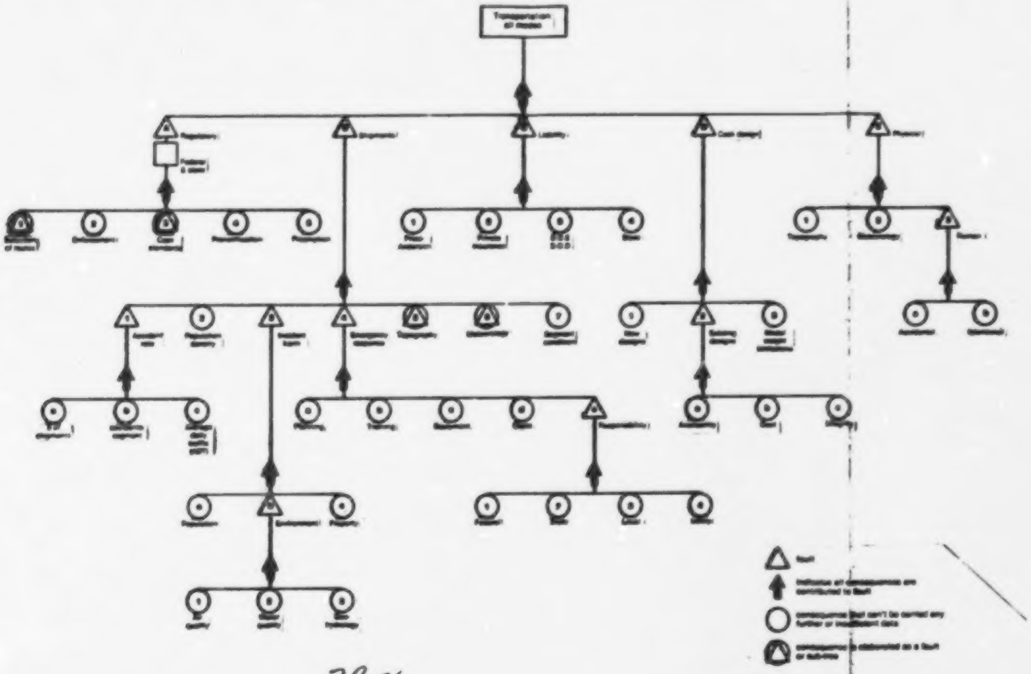
## Conceptual Analysis Model for Transportation Modes



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# Appendix B

## Outline for Transportation and Multiplicative Risk Model

I. Obtain road and water maps

  A. Roads

    1. Federal
    2. State
    3. County
    4. Local

  B. Rail lines
  C. Waterways

II. Plat route segments

  A. Main corridors of highways

    1. State
    2. Federal
    3. County

  B. Rail corridors

    1. Traffic
    2. Condition of track
    3. Number of hazardous materials shipments

  C. Ports/capacity

    1. Lakes Michigan and Superior
    2. Mississippi and St. Croix

III. Determine total route mileages

  A. Highways
  B. Rail
  C. Water

IV. Conduct Survey

  A. Risk factor

    1. Average daily traffic (ADT) and traffic density (TD)
    2. Road
    3. Rail
    4. Waterway
    5. Route segment
    6. Accident rate

## Preliminary Risk Model

I. $RI = (RF)(CF)$

RI = Risk Index
RF = Risk Factor
CF - Consequence Factor

II. $RF = \frac{(TD)(AFT)}{100}$

TD = Traffic Density for 24 Hours
AFT = Average Form of Threat
100 = Constant

$$TD = 10\left(\frac{TVC}{TRM}\right)$$

10 = Constant
TVC = Total Vehicle Count
TRM = Total Route Mileage

$$AFT = 10\left(\frac{TD}{AC}\right)$$

AC = Accident Rate
10 = Constant

III. $CF = \frac{PD}{D(P_R)} + D(E_V + P_V)$

$P_D$ = Population Density Per Square Mile

$P_R$ = Population Exposed to Radiation

D = Dosage

$E_V$ = Environment

$P_V$ = Average Land Use Value Per Square Mile

$$E_V = \frac{APW + APGH + APA}{10}$$

10 = Constant
APW = Average Percent of Waterway
APGH = Average Percent of Geohydrology
APA = Average Percent of Air

B. Consequence factor

1. Population

a. Density
b. Dosages

2. Environment

a. Affected air
b. Affected waterway
c. Affected geohydrology
d. Affected soils
e. Affected wildlife

3. Property value of land use factor
4. Production facilities

V. Conduct production and storage facilities study

A. Amount of waste produced per year
B. Amount of waste being stored
C. Amounts of waste shipped (projected)

1. repository (within or outside region)
2. MRS (within or outside region)
3. Reprocessing (within or outside region)

VI. Determine risk index - development of risk factor formulas

VII. Evaluation of model

ASSOCIATION
OF AMERICAN
RAILROADS

**William H. Dempsey**
President

August 15, 1985

The Honorable James J. Florio
Chairman
Subcommittee on Commerce, Transportation
and Tourism
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20515

Dear Congressman Florio:

Dr. Fred Millar, Director of the Environmental Policy Institute's Nuclear and Hazardous Materials Transportation Project, has submitted written testimony on the transportation of nuclear and hazardous materials for the hearings your Subcommittee held on August 1 on the transportation of nuclear materials. Dr. Millar made several misleading, if not irresponsible, statements concerning the railroad industry which the Association of American Railroads would like to rebut for the record.

Dr. Millar criticized the "dominant role played by the railroads in [setting] rail tank car safety standards." He says, "This example [of shipper and carrier influence on government regulation] has had particularly disastrous results, as body counts in Waverly, Tennessee and elsewhere have borne out."

Dr. Millar would have you believe that accidents involving tank cars containing hazardous materials are killing people every day. In fact no one has died as the result of a hazardous materials accident on a railroad in 1985. Nor did anyone die from such an accident in 1984, or 1983, or 1982 or 1981.

We are proud of the efforts the railroad industry has been making in the hazardous materials area. While seventy percent of the transportation of hazardous materials takes place on railroads (excluding petroleum), less than ten percent of the hazardous materials transportation incidents are railroad incidents. In 1984, the railroads transported approximately 1,144,000 carloads of hazardous materials. There were only sixty-one releases from railcars resulting from accidents.

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The railroad industry as a group has regulated the construction of tank cars since the beginning of this century. Today, the railroad industry continues to play an important role in tank car regulation through AAR issued tank car specifications compatible with DOT regulations. The railroads have a large stake in ensuring the safe design of tank cars. Tank cars are, for the most part, owned by non-railroad entities, and the railroads must be assured that tank cars containing dangerous cargoes will meet the demands of the rigorous railroad environment. In previous testimony before your Subcommittee we have discussed the various safety programs conducted by the AAR and the railroad industry. We will not repeat that testimony here.

The record is clear. The railroads' record in the hazardous materials area going back to the turn of the century shows a responsible, safe industry. No one who has studied the tank car area in detail has come to a contrary conclusion. Dr. Millar's superficial statements indicate a suspicion of safety activity by private industry that in this instance is not warranted by the record.

Dr. Millar's reference to the Waverly, Tennessee, accident is instructive. First, Dr. Millar has to reach back to the previous decade to make his "point." Second, Dr. Millar cites an accident which, upon examination, provides no support for his assertion. The Waverly, Tennessee, accident was not the result of inadequate industry standards. Tank cars meeting the same specification are still used today. The tragedy at Waverly occurred when a tank car that was involved in a derailment was set aside and ruptured violently 40 hours after the derailment. None of the parties investigating the accident, including the National Transportation Safety Board, found any problems with the tank car itself. We know of no safety device that would have prevented the rupture. The Safety Board made numerous recommendations upon the conclusion of its investigation of the derailment, none of which are relevant to setting standards for tank cars.

Dr. Millar also stated, "[a]fter a series of disastrous explosions of rail tank cars in 1977 put a lot of bodies in graves, the tank cars were belatedly retrofitted with new safety devices." The devices Dr. Millar refers to are top and bottom shelf couplers, head shields and thermal protection systems. These devices did not exist prior to the 1970's, although as early as 1971 AAR specifications were being amended to incorporate improved coupling arrangements. Furthermore, Dr. Millar implies that industry was reluctant to make changes. In fact, it was industry that studied head shields and top and bottom shelf couplers in 1971 and 1972, and in 1973 tested head shields and top and bottom shelf couplers in actual service. Head shields were not required until 1974, and then only for certain new tank cars. In 1974, the AAR filed petitions requesting that DOT require top and bottom shelf couplers on all new cars, require that certain existing tank cars be retrofitted with these couplers, and study whether all tank cars should be retrofitted with these shelf couplers. DOT rejected these petitions in 1975. It wasn't until later that DOT required top and bottom shelf couplers. Thus, there was nothing "belated" about the industry's actions.

While industry-wide tank car specifications have been in existence for decades, tank car technology is constantly being improved and the specifications are constantly changing. The technology for a risk free tank car and a risk free railroad industry does not exist and, as a result, hazardous materials accidents will occur. The key question is not whether accidents occur, but whether the railroad industry is doing everything possible to minimize the frequency and severity of these accidents. We believe we are.

Dr. Millar also addressed routing questions. He states that "DOT studies say that in some cities...rerouting [railcars to avoid populated areas] could substantially reduce the risk of catastrophic accidents." The DOT study Dr. Millar is referring to is a study published in 1982 by the Transportation System Center under the direction of DOT's Research and Special Programs Administration. Let's examine what the study, entitled "Aggregate Effects of Rerouting Hazardous Materials Railroad Shipments," actually said.

The DOT study estimated what the hazardous materials flow patterns were for the U.S. railroad system in 1977 and then hypothetically altered these patterns in two ways to avoid populated areas. One pattern kept the same junctions between railroads so that the market share of railroads would not be affected, but used different routes within an individual railroad system. The other pattern ignored existing junctions. Accident and casualty rates were then computed for these alternative routes.

The study concluded that there would be no advantage to rerouting railroad shipments with existing junctions maintained because the advantage of reduced population exposure would be counteracted by the resulting circuity in shipping patterns and diversion of traffic to lower quality track. Rerouting with new interchange points would significantly reduce casualties, the study noted, but at a cost of extreme changes in railroad market shares. These findings were based on data from 1976 to 1978. Since the industry's safety record has substantially improved in recent years, any benefits from rerouting postulated by the study are overstated. In view of the reduction in the number of injuries associated with rail transportation of hazardous materials, the safety benefits from rerouting would be minimal (the study hypothesized 240 annual hazardous materials casualties, while in 1983 there were only 69 injuries and no deaths). Furthermore, the study did not include an analysis of the extent to which there would be a diversion of hazardous materials traffic from railroads to less safe modes because of the additional costs and increased transit times resulting from circuitous rerouting.

Dr. Millar evidently is convinced that rerouting would be beneficial. It is unclear what evidence leads him to that conclusion. For the reasons stated rerouting cannot be justified on the basis of the DOT study.

Dr. Millar also believes that shippers and carriers of hazardous materials should pay permit fees "for substantially raising the standard of training and equipment for emergency responders." Again, he refuses to recognize the current efforts of private industry.

The railroad industry has devoted substantial resources to emergency response. The AAR has developed a hazardous materials information system which includes commodity specific emergency action guides, computerized information to aid in the selection of the best measures to take at a specific emergency scene, a medical reference manual containing information for physicians treating those exposed to chemicals, and a hazardous materials data base with information on health hazards, protective clothing, and pollution problems. The AAR's Bureau of Explosives publishes books, pamphlets, and posters on hazardous materials. Bureau hazardous materials inspectors participate in various training programs and participate in fire fighter conventions. Many local fire departments have AAR hazardous materials information.

The AAR and individual railroads have their own training programs. Fire fighters and other first responders are given training in basic emergency response training. Railroads have employees who conduct training programs for fire fighters on a regular basis. The AAR has just instituted a more sophisticated training program at its Transportation Test Center in Pueblo, Colorado, for emergency response professionals. At the Test Center the AAR has placed a training academy with classrooms, laboratories, and accident simulation sites.

The railroad industry views emergency response training with the utmost seriousness, recognizing the hazards posed by inadequate responses to hazardous materials incidents. The industry's training efforts are a result of the importance placed by the industry on the safe transportation of hazardous materials. Dr. Millar is not aware of or ignores the vast number of fire fighters and local officials who have benefitted from railroad (and other) industry training and hazardous materials information programs. Also troubling is the lack of an analysis by Dr. Millar of the type of training he perceives as needed. For example, he notes that eighty percent of the fire fighters in the U.S. are volunteers. Many of these volunteers (and professionals, too) work in areas where they never will see a train accident, let alone one involving a hazardous material. The turnover for volunteer forces is high, although the industry's efforts to provide fire fighters with basic hazardous materials training is ongoing. The point is, you cannot expect most localities to have emergency response experts. Dr. Millar does not seem to recognize this fact in his casual analysis of emergency response issues.

Mr. Chairman, so that the record will be clear, we would appreciate these remarks being made a part of the record for the hearing your Subcommittee held on the transportation of nuclear materials.

Sincerely,

W. H. Dempsey